

BUTANE-PROPANE

News



No. 31

DECEMBER 1941

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DELIVER AND COLLECT WHEN READING METERS (Page 16)

DEVELOPMENT OF LP-GAS VALVES AND REGULATORS (Page 22)

MANUAL AND AUTOMATIC CONTROLS (Page 34)

REDUCED TARE WEIGHT

1926...

450 LBS. OF STEEL
TO TRANSPORT 100 LBS.
OF PROPANE

TODAY

93 LBS. OF STEEL
TRANSPORTS 100 LBS.
OF PROPANE

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Years ago when the industry was in its infancy, the shipping containers used were heavy, cumbersome and of limited capacity—some weighing approximately 4½ lbs. of steel per pound of propane shipped.

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ity. However, in accomplishing this weight reduction necessary strength has not been sacrificed. Today's Hackney cylinder is perfectly balanced between adequate strength and light weight. Utmost dependability and absolute satisfaction is assured.

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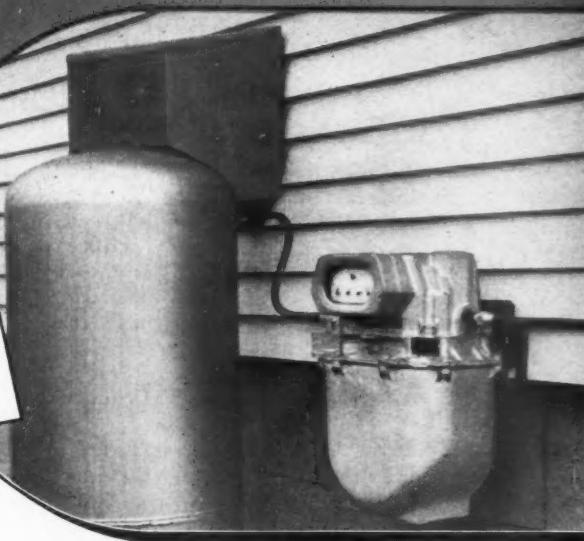
Containers for Gases, Liquids and Solids

Because of the urgent need of materials for National Defense, deliveries may be interrupted. PRESSED STEEL TANK COMPANY, in addition to doing its share for National Defense, has the facilities for production of civilian needs and is doing its utmost to procure materials with which to continue to serve its customers during the present emergency.



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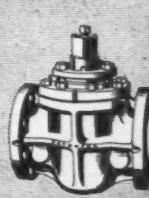
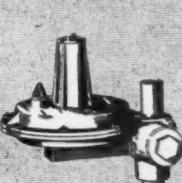
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Valve



BUTANE-PROPANE

News

Reg. U. S. Pat. Off.



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Publication Office: LOS ANGELES, 1709 West Eighth Street, DRexel 4337.
Branches: DALLAS, 3645 Haynie Ave., Ph. Justin 8-1764; CLEVELAND,
2232 Adeline St., Lakewood, Cleveland, BOulevard 5711; CHICAGO, 1064
Peoples Gas Bldg., HARrison 6634.

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December, 1941. Volume 3, Number 12. BUTANE-PROPANE News is published monthly. Copyright 1941, by Western Business Papers, Inc., at 1709 West Eighth Street, Los Angeles, Calif.

Subscription price: United States, Mexico, Cuba, South and Central American countries (in advance), 25 cents the copy, one year \$1.50; three years for \$2.50; all other countries \$3.00 per year. Entered as second-class matter May 29, 1939, at the post office at Los Angeles, California, under the Act of March 3, 1879.

Member Audit Bureau of Circulation; Associated Business Papers, Inc.

Publishers: G A S, The Natural Gas Magazine; HANDBOOK BUTANE-PROPANE GASES.

BC

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of

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L. P. G. Storage Systems

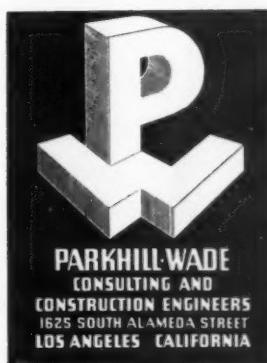
L. P. G. Municipal Systems

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**SPECIAL LIQUEFIED PETROLEUM GAS
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Pumps L.P.G Safely-Accurately!



QUALITY **TOKHEIM** MODEL 945

AN OUTSTANDING VALUE AMONG L.P.G. PUMPS

Like all Tokheim Pumps, Model 945 L.P.G. Dispenser and Metering Unit is famous for unfailing accuracy. Thanks to its patented differential control, a solid column of liquid (no vapor) is maintained all the way through the metering chamber — assuring accurate recording and accurate delivery. It is always safe, too — with a special "dead man" control and explosion-proof control switch. High speed delivery, double 100-gallon registering dials and cam type automatic nozzle valve are other special features. An outstanding value from any angle.

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- Accurate Measurement
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WRITE FOR BULLETIN NO. 311



TOKHEIM OIL TANK & PUMP COMPANY

GENERAL PRODUCTS DEPARTMENT

DESIGNERS AND BUILDERS OF SUPERIOR EQUIPMENT
FORT WAYNE SINCE 1901 INDIANA

LETTERS

Gentlemen:

Could you give us any information regarding the ripening of tomatoes by propane gas?

M. R.

New Jersey

Propane gas can be used for the ripening of tomatoes. However, it would serve as a source of heat supply rather than as the ripening agent. Ethylene gas, also available in cylinders, is often introduced into the atmosphere containing fruit or vegetables, to hasten the ripening process. The combination of temperature control and ethylene gas gives very rapid ripening and adds to color.

A warm air furnace of substantial construction but without the outer casing is installed so that the heating surface is inside the ripening room while the burner and controls are accessible through a small door built into the outside wall. This type of installation has been developed to avoid accidents or explosions due to unburned gas in the poorly ventilated enclosure. Note that ethylene gas is also inflammable and the amount used must be controlled so that the atmosphere is below the flammable limit.—ED.

Gentlemen:

Please tell me the differences between propane, butane and isobutane.

M. S. R.

Florida

Below you will find a table from our Handbook Butane-Propane Gases showing the differences in properties of propane, butane and isobutane. You will note that the butanes are slightly heavier liquids than propane. However, the heating value per lb. of either propane or butane is not very much different, being about 21,500 B.t.u.'s per lb.

The limits of inflammability indicate that about 2% of the butanes in air are inflammable up to about 8½%. Mixtures with air which are leaner or richer than these two limits will not support flame movement.

The boiling point of propane is very much lower than that of the butanes, being about -43° F. Consequently, propane is distributed in cylinders in the colder climates. Also, the vapor pressures of pure propane are considerably higher than those of the butanes. Consequently, tanks and pressure relief valves must

be designed for higher pressures when distributing propane.

The data in the table indicates that when a pressure gage is attached to a cylinder of pure propane and the liquid temperature is 100° F. this pressure gage would read 172 lbs. per sq. in. If butanes were contained in the cylinder,

	Propane	Isobutane	Butane
Lbs. per gallon, liquid	4.24	4.72	4.85
B.t.u. per cu. ft. of gas.....	2500	3270	3270
B.t.u. per lb. (practically constant)	21,600	21,300	21,300
Limits of inflammability.	2.3 to 9.5	1.9 to 8.4	1.9 to 8.4
Specific gravity of liquid	0.509	0.566	0.582
Boiling point of liquid.....	-44°F.	14°F.	32°F.
Vapor pressure, lbs. per sq. in. gage @ 60°F..	92	24	12
@ 100°F.	172	59	37

the pressure gage would read somewhere between 37 and 59 lbs., depending upon the amount of isobutane and butane contained in the mixture. It is understood that the temperature of the liquid would have to be 100° F. in order to reach these pressures.—ED.

Gentlemen:

We would like to know where we could get a chart showing the butane and propane gas capacity through a given orifice when we have over 11 inches water pressure. All the charts we have stop at the 11 inches pressure.

H. W. G.

Oklahoma

There is no chart available showing the butane-propane gas capacity through a given orifice for pressures over 11 inches water column, for orifices for domestic appliances operating on butane-propane gases are generally selected on the basis of a normal pressure of 11 inches water column.

This is explained in an article by W. R. Teller, research engineer, American Gas Association Testing Laboratories, entitled, "Technical Phases of Propane-Butane Utilization." The

American Gas Association Testing Laboratories also has specifications for regulator sets used with butane-propane gases. The limiting pressures for the operation of domestic appliances are given by these regulator requirements. Typical specifications will be found in the section on appliance utilization in the Handbook BUTANE-PROPANE Gases.

It is possible that your inquiry refers to the selection of orifices for industrial equipment. The flow through such orifices is given over a wide range of pressures for air, manufactured and natural gases. Such information is contained in the Industrial Gas Series Book, "Combustion", published by the American Gas Association, 420 Lexington Ave., New York, N. Y. It would be possible to obtain a correction factor for rough approximations by referring to the fundamental flow formula given in Mr. Teller's article. This formula would indicate that the flow varies inversely as the square root of the specific gravity. The charts in the book "Combustion" have been corrected for changes in the specific gravity at pressures beyond 10 inches water column. The specific gravity of propane at atmospheric pressure is 1.52 and of butane 2.0. A correction factor may be applied to the values read from the above quoted charts. The flow of liquefied petroleum gases beyond 10 pounds as used in industrial burner applications can best be solved by the application of thermodynamic formulas.—Ed.

Gentlemen:

The treasurer of the State of Iowa, W. G. C. Bagley, has referred me to you for information on the use of the new gas fuel, butane. Also, please tell me the price of your magazine.

H. C.

Illinois

We can think of no better way to acquaint you with many of the uses of butane and other liquefied petroleum gases than to send you several copies of back issues of BUTANE-PROPANE News, and these are going to you immediately. From these you will be able to get a general idea of the scope of the industry and if you later wish to know more definitely regarding any particular phase of the subject, we will try to supply the information.

The price of our magazine is \$1.50 for one year, or \$2.50 for three years.—Ed.

Gentlemen:

Certainly, I am a subscriber to the BUTANE-PROPANE News. I have been receiving it for one and one-half years and I must say that it is the only magazine that I take time out from the busy turmoil to read.

Almost three years ago my wife and I

started out in the LP-Gas business, with very little capital and everyone we talked to would give us from one to six months to close up as there was seemingly no place in this so-called dust bowl for an appliance dealer and LP-Gas business, but fully determined that nothing would stop us and that the main thing to do was to make plenty of calls, and do the right thing, we started.

Even though the business is still small, the steady gain has certainly been gratifying.

Almost two years ago, I hit upon the plan for leasing equipment instead of selling, in order to build gas load and make a better future in gas business. We have approximately 100 installations and are making a legitimate profit from our gas. It has never seemed logical to me to give the gas away to stimulate appliance business.

Again, I wish to say that I attribute a part of our success to the BUTANE-PROPANE News and that ever-reliable source of information, the Handbook BUTANE-PROPANE Gases.

Yours for more success in the LP-Gas industry.

W. F. Kite

Clayton, New Mexico

Congratulations, and more success to you. We are glad our publications have helped you.—Ed.

Gentlemen:

We have been very much interested in a series of articles appearing in BUTANE-PROPANE News, called the "Bottle Gas Manual." We note that the series has been written by C. C. Turner. We would like to have this complete series in book form.

Will you kindly advise us if this can be purchased from Mr. Turner, and, if so, can you give us the cost per copy?

G. F. G.

Minnesota

We are glad to hear that you are interested in Mr. Turner's "Bottled Gas Manual Series", now running serially in BUTANE-PROPANE News.

The chapters on the Manual started in the July, 1941, issue and will continue on a monthly basis until the Manual has been completed, which will take about 24 issues altogether.

This series is in manuscript form, and has never been printed before. It is our intention to publish it in book form at a later date and when that occurs we will be very glad to let you know.—Ed.

• BUTANE-PROPANE News welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.

BUTANE-PROPANE News

Geared TO DO IT



A YEAR AGO, Minneapolis-Honeywell anticipated a heavy demand for controls in 1941. Materials were purchased well in advance to meet the expected demand. But, before the year was three months old, we realized we had badly underestimated . . . we found the requirements of all users growing rapidly . . . with increases ranging from 40 to 200%. Who would have dreamed of such phenomenal demand?

HERE was an emergency job ahead . . . but Minneapolis-Honeywell Was Geared To Do It!

THAT we met this phenomenal demand is known to you. To do it the far reaching Minneapolis - Honeywell organization . . . 52 branches from coast to coast . . . had to prove that it could BUY as well as sell. When word went out that this or that was needed, our men in the field responded . . . took hold of the job of finding the material . . . held on with bulldog tenacity until they got it . . . then the Airlines delivered it! They were serving you . . . enabling us to accomplish almost the impossible, and justifying your faith in our ability to deliver.

DELAYS therefore have been few and far between, and with the exception of those due to model changes, they must be attributed to just one cause, a cause beyond our control, inability to obtain materials. In fact, among our customers, those who have suffered delays have had difficulties in obtaining other critical material, so few if any have had otherwise completed equipment held up awaiting M-H controls.

IN an emergency, the greatest demand is always placed on the leader with quality products . . . Minneapolis-Honeywell has the manufacturing capacity, and the skilled personnel. Therefore the increases in our shipments would have been still greater and shipments even more prompt had we been able to secure critical materials faster and in larger quantities. We are proud of the fact that in spite of the difficulties so few customers have been delayed by lack of controls.

MINNEAPOLIS-HONEYWELL facilities were geared to do the manufacturing job that lies behind us . . . they are geared to do the job that lies ahead!

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY



W. F. VERKAMP
Guest Editor for December

Work for a Middle Course

By W. F. VERKAMP

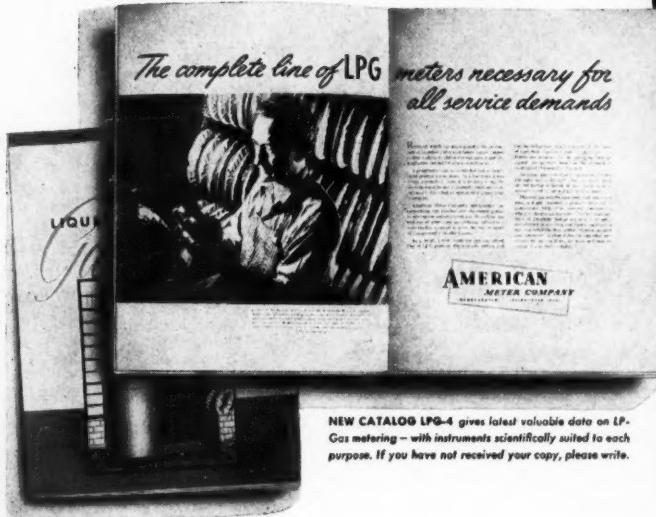
President, The Verkamp Corporation, Cincinnati, Ohio

THE liquefied petroleum gas industry is definitely an essential industry in the American way of life, but in times of stress, such as we are now experiencing, it naturally must be called upon to make some sacrifice. To maintain our fighting strength and to add to our ability to defend ourselves against an aggressor, we must preserve the morale of all the people of this nation. The public state of mind should not be depressed by unnecessary sacrifice, but on the contrary every effort should be brought about to maintain a buoyancy of spirit enabling us to carry on to success a well-planned program of defense.

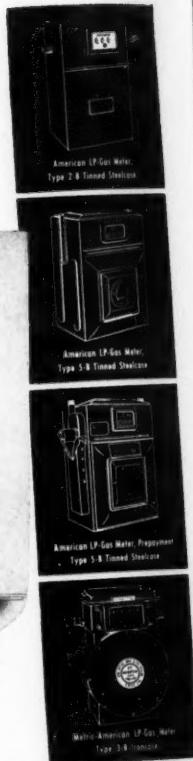
Any action that would tend to eliminate the liquefied petroleum gas industry from American everyday life is indefensible. It would be fundamentally wrong and highly impractical. To retard its progress by depriving the industry of the materials required to enable consumers to enjoy the comforts and benefits it furnishes would impose unwarranted hardships and sacrifice upon a vast number of people in their daily life, and thereby tend to depress the public state of mind. The result of this would be highly undesirable.

However, to permit the liquefied petroleum gas industry to race forward unbridled would not be consistent with the order of the day. Some sacrifice is unquestionably necessary in this industry, as well as in practically every industry; so there must be some middle course, a course that is clear, just and equitable. This course might be determined by an allowance of volume based on a percentage of the performance during some representative period in the past. It is the task of the men of the industry to ascertain what that volume should be, and then, to convince the proper officials at Washington.

Metering:



NEW CATALOG LPG-4 gives latest valuable data on LP-Gas metering — with instruments scientifically suited to each purpose. If you have not received your copy, please write.



ITS PLACE IN LP-GAS SALES PROMOTION

- In the handling of Butane-Propane gases, station metering and bulk plant metering of the vapors are established practices. • Today, however, the industry is fast realizing that metering not only has a functional use in practically every other method and phase of LP-Gas distribution, but that it also has a direct influence upon sales.
- The "good business" psychology of this ex-

tended use of metering is based upon the recognized public approval of metered sales of gas, electricity and water. Above all, metering means "honest measure," from the consumer's viewpoint. • The long experience of American Meter Company in the LP-Gas field, and its complete range of meter types, give full assurance that customers' confidence will not be misplaced.

GENERAL OFFICES - 60 EAST 42ND STREET, NEW YORK, N.Y.

AMERICAN
METER COMPANY
INCORPORATED 1884
(ESTABLISHED 1884)

A-107

MAINLY BEYOND THE MAINS

Standardization Advanced

The Liquefied Petroleum Gas Association is doing a useful and important job, cooperating with the U. S. Bureau of Standards, in formulating a uniform standard of bidding for defense housing projects. A formula is being developed, and will shortly be released, whereby the amount of storage capacity and the sizes of piping required for maximum demand loads in terms of B.t.u.'s per hour will be established.

The standards will cover both aboveground and underground systems, and will represent the best technical opinions of a committee composed of representatives of refiners, manufacturers and distributors of LP-Gas.

Simple application of the formula on all future installations may be expected to eliminate the gas failures, especially during cold weather, that are directly traceable to inadequate storage or piping for the peak loads anticipated.

With regulator freeze-ups practically eliminated as a winter problem, we look forward with enthusiasm to the day when the last argument used by the electrical competition as to the unreliability of LP-Gas service will have been eliminated.

Which doesn't mean, however, that Reddy Kilowat won't dig another muddy puddle to get his nimble little fingers into.

Survival of the Fittings

We are thoroughly sold on the proposition that the manufacturers of equipment have done everything within their power to dole out their dwindling supplies of materials for use in LP-Gas installations in such a way as to cause a minimum of hardship to the dealers who desperately need these materials. But form letters and good intentions can't be cemented together to take the place of cylinders, tanks or regulators. And while cooperating for national defense has a resounding ring, it doesn't put any much needed new customers on the delivery routes.

In spite of the fact that at present more and more materials are being requisitioned for the war machine, there are indications that it is neither politically expedient nor economically sound to cut all of the ground out from under normal manufacturing operations. As this idea gains momentum, which it will have to do if anything approximating national unity is to be accomplished,

there no doubt will be some materials even of a critical nature, made available for those industries that put up a fight for them in the first place, and then show a disposition to use them intelligently after they get them.

In preparation for that time we are convinced that the best step that could be taken by manufacturers of supplies and appliances on which this industry depends would be to reduce the number of sizes, models and types to a minimum—even at the cost of discarding some of the highly touted "special features" which often boil down to nothing more important than topics for salesmen's conversation.

Manufacturers in times past have often expressed themselves as favoring standardization; the only trouble has been that each manufacturer thought the trade ought to standardize on his line exclusively. And yet it would be unfair to lay all the blame for the unstandardized diversity in styles, sizes, makes and models on the manufacturers alone. Distributors and even dealers have fought like a she-bear over a cub at the very mention of abandoning some gadget that might necessitate even a trifling change in their installation practices.

Manufacturers heavily dependent on brass and copper are already announcing the discontinuance of certain items for which others can be substituted. Under the press of necessity

some simplification of equipment is thus being achieved. It is to be hoped that the movement will gain momentum, and that even when defense restrictions are eased, these same manufacturers will see the wisdom of keeping styles and sizes within practical and reasonable limits.

The advantages of such simplification in the period of abnormal markets and curtailed supplies of raw materials are self-evident. If one or two regulator styles could be substituted for the dozens of equal capacity now being sold, all of the materials going into them would be immediately available for use, rather than tied up in stocks that serve no purpose until they are shipped to the installing trade.

The question has been asked, and is worth repeating: Is there any necessity for having propane cylinders manufactured in 20, 25, 40, 60 and 100 pound capacities? What does this variety of sizes accomplish that could not be handled by three sizes—let us say 25, 50 and 100 pounds?

Why all the sizes and styles in connectors, adapters and couplings? What has a 30-inch pigtail got that a 20-inch lacks, except 10 extra inches of copper tubing that has become almost impossible to obtain?

In the matter of gas appliances, such as ranges, water heaters, space heaters and other domestic and commercial equipment the process of eliminating almost identical models is already under way. We do not

believe that this is destined to create any undue sales resistance for the models continued in manufacture. Rather we feel that elimination of numbers of confusing similarity will enable the customer to more readily make his selection.

The wistful hope that defense dislocations would prove to be just a bad dream from which we would soon awaken has gone with the wind. The present best-guessers in Washington predict that it will be 1943 before industry is even geared up to its required output of arms and ammunition. But, unless all civilian consumption is supposed to hold its breath for the next two years, there will have to be some supplies intelligently allocated for essential civilian needs.

Unless the LP-Gas industry can establish its right to a share of these materials, as purveyor of an essential service to both homes and business, and unless it exercises the greatest foresight in its fabrication so that they are used to the utmost advantage in maintaining service, this industry will remain completely without standing in the defense pattern.

As evidence not only of the industry's willingness, but of its enlightened ability to function in essential public service, we recommend that every single item of unnecessary equipment on the list of every manufac-

turer be forthwith discontinued. And to every dealer and distributor who is notified of such discontinuance, we recommend that he take it—and like it!

Save the Pieces

An idea crossed our path the other day—just an idea, but it may be worth doing something about. Where old model stoves are traded in on new ones the current practice is to clean up and repair those that might have some re-sale value, and just cord the others up in the back yard and wait for the junk man.

But there is hardly a stove ever taken out of service that doesn't have some parts, whether they be valves, doors, panels or burners, that cannot be salvaged for use as replacements on others of the same model. The idea is simply to dismantle trade-ins, label the useable material and store it where it can be used for future repair or rebuilding.

The used parts yard—once considered a minor racket in the automobile industry—is now a thriving and profitable business. As models are discontinued in stove manufacture, replacement parts will tend to disappear, first from the manufacturers' stocks, and then from the dealers' shelves. Serviceable, reclaimed items may prove well worth the storage space they take up until the time that they can be used.

More Than 4000 Copies This Issue



The pictures on these facing pages show the liquefied petroleum gas plant on the desert near Las Vegas, Nev., that was specially built for the U. S.

Nevada Utility Expands

THE Las Vegas Gas Co., Las Vegas, Nev., has been operating an undiluted butane plant and distribution system since 1931, serving a town of 8500 population and recording a steady growth since inception.

With the expansion of the defense program, there was built within seven miles of the town an army aviation training school that consists of a camp and facilities to handle 3000 men.

Fuel on the desert is always a



H. W. Wickstrom

problem. The army engineers conferred with the gas company and finally arrangements were made for the company to install a plant adjacent to the camp to deliver a 3000 B.t.u. per cu. ft. undiluted mix into the distribution system.

Facilities were installed to provide a send-out of 100,000,000 B.t.u. per hour to take care of the peak requirements of heating, water heating, cooking and fuel for the operation of five steam boilers used at the mess halls and the hospital.

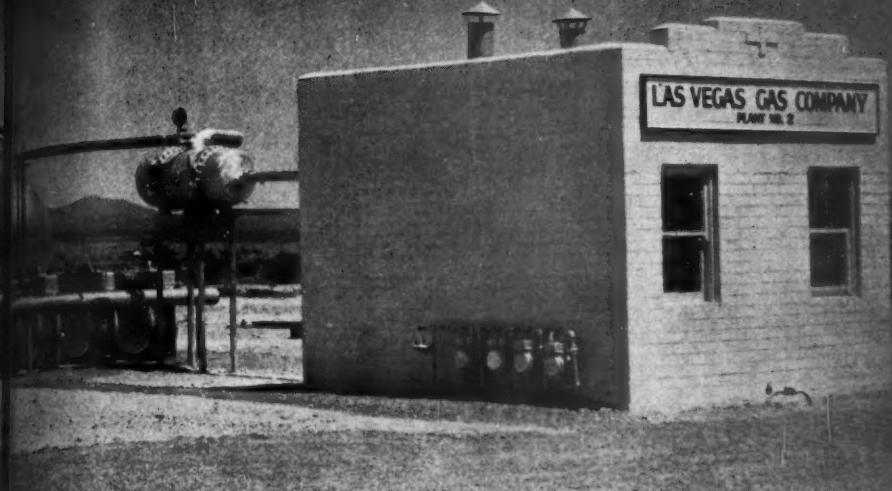
A site 200 x 200 ft. was acquired which is enclosed by an 8-ft. steel wire mesh fence. The storage consists of two 10,000-gal. tanks laid out to allow for the installation of two more tanks of similar size if the load requirements demand it.

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army aviation training school. Facilities permit a send-out of 100,000,000 B.t.u. per hour to care for peak requirements for many domestic purposes.

For National Defense

Fuel is received by tank truck, and a Smith pump driven by a 3-hp. motor is used for unloading.

Energy of 20-hp. is required to vaporize the liquid at the peak loads and is furnished by two 10-hp., 15 lbs. per sq. in. working pressure steam boilers located in a concrete block building.

Distribution pressure of $3\frac{1}{2}$ -lbs. per sq. in. is held constant by four 2-in. Fisher regulator, two operating on the vaporized gas and two tied into the tops of the tanks for emergency service.

The gas is billed on a therm basis, the delivery being determined by four No. 5 Emco meters manifolded in parallel which record in cubic feet. Pressure and temperature corrections are determined by

a combination recording, temperature and pressure gage.

All valves in the circuits up to the regulators are Merco Nordstrom steel plug cocks, and valves in the down stream side are semi-steel.

The plant was built and ready for operation in 30 days after the agreement was entered into and gas service was started on July 3 of this year.

The estimated load is 600,000 gals. per year, which is materially in excess of the total output of the present utility operation.

The plant was designed and the installation supervised by Harold W. Wickstrom, Los Angeles, who is consulting engineer for the Las Vegas Gas Co.

Deliveries and Collections Are Combined with Meter Readings

WHETHER propane should be sold by weight, C.O.D., or metered as a gas service to the customer is a moot question within the ranks of LP-Gas operators throughout the country. There are, without question, advantages to each type of operation, and the proponents of each are often able to present elaborate justifications for the particular style that they prefer.

For a little over four years L. L. Parlett, Easotane "Happy Cooking" distributor of Waldorf, Md., has been building up his service to the country that lies roughly southeast of Washington, D. C., first as a Fuelane dealer and now as the owner of a modern 15,000-gal. propane bulk station, serving fuel to more than 2000 customers of his own, and to other dealers in Maryland and Virginia.

"Happy Cooking Standards"

All of the residential consumers of this company are on a metered service, and the bills are rendered monthly in terms of "H.C.S." (Happy Cooking Standards). One "H.C.S." is nothing more or less than one tenth of a pound of propane, as a matter of fact, the index of the meter being constructed to read in pounds with a fixed cypher added after the dials.

To be efficient and economical, a meter reading system must be well

By ELLIOTT TAYLOR

organized as to routes and procedure before the route men are sent out, and this organization is an attribute of the business that Mr. Parlett has developed to a high state of perfection.

The entire territory served is divided into 17 routes, so laid out that the traveling time of the combination meter readers and delivery trucks is used most effectively. Two men travel with each truck, and each truck carries 30 cylinders of propane for replacement of cylinders that may have been depleted below the amount necessary to carry the household over to the next meter reading period. The reserve allowed on every installation is 20% in excess of the highest amount used by that customer in any single month. Each team will average 50 meters read and 30 cylinders changed per day.

The meter reader carries with him a route list for the day's reading and installing. As a check on his own observation, the office marks a "C" (indicating possible change) after the name of every customer whose previous month's reading indicated a cylinder change might be necessary. This is not an instruction to change cylinders if a new one is not required, it merely calls the reader's attention to those

places where nearly depleted cylinders may be expected to occur.

In addition to his route list, the reader carries with him a sheaf of bill forms, one made out to every customer on his list. Upon these bills have been printed from addressing machine plates the name and address of the customer and, from office records, the Previous Reading, the Reading of Present Cylinder When Installed and the Highest Amount Any Month, in the appropriate columns as shown.

The meter reader adds to this

the Present Reading in the column reserved for this purpose. He then subtracts the amount of the Reading of Present Cylinder When Installed, from the Present Reading, which shows the amount of gas that has been used from the connected cylinder. This in turn subtracted from 1000 "H.C.S.", the standard filling of a 100-lb. propane cylinder, shows him the amount of gas that remains in the cylinder. If this amount is less than the Highest Amount Any Month figure, plus 20%, a new cylinder is

Previous Reading H.C.S.	Present Reading H.C.S.	Gas Used H.C.S.	Gross Bill \$	Net Bill \$
----------------------------	---------------------------	--------------------	------------------	----------------

Final Date to Pay Net Bill
Gross Bill Applies After This Date

Arrears	Total
Credit	Total

Meter Reading From To Total

L. L. PARLETT
Waldorf, Md.

To
.....

Reading of Present Cyl.
When Installed.....
Highest Amount

Any Month

.....

Last Day to Pay Net Bill

GROSS | NET

\$ | \$

Arrears

Total

Credit

Total

To

Mail Stub with Remittance

ROUTE

Name	Results	Meter Read.	Old Tank No.	New Tank No.

TANK CHART

Date	Name	Route	Tank No.	Pounds Out	Pounds Refill	Date	Pounds Over	Pounds Under

This bill form, route list and tank record show advantages of the carefully prepared system of L. L. Parlett, Waldorf, Md.

installed and the partially empty one taken back to the plant for refilling.

When a change of cylinders is necessary, the reader also marks on his route list the meter reading, the serial number of the tank removed and the number of the one installed to replace it.

Route Men Collect, Too

While the meter reader on his route is not instructed to collect bills, there are instances where the customer prefers to pay in this manner, rather than wait for a statement and then mail or carry the payment into the Waldorf office. Every route man carries a rate schedule chart, and when requested by the customer, he is authorized to compute the amount of the bill from his reading, collect and give a receipt all on the single call.

The metering system has been subject to abuse from some quarters on the grounds that due to the expansion and contraction of gas under conditions of fluctuating temperatures, the readings are either higher or lower than the actual pounds of propane they represent. While for office purposes, a "Happy Cooking Standard" is regarded as one-tenth of a pound of propane, it should be noted that the "H.C.S." is a volumetric unit of gas for which the customer pays and there is no real or implied obligation on the part of the company to guarantee that that unit is a standard in terms of pounds of fuel consumed.

Nevertheless, the Parlett system goes all the way, not only in pro-

viding a means for checking the accuracy of the meters, but also in keeping records from which customer complaints may be answered. This continuous record of every cylinder in use is carried on the Tank Chart.

Here each cylinder is identified by the serial number, as well as by the name and route number of the customers where it was last in service. As each tank is returned to the bulk station, the number of Pounds Out is entered in the column provided, this entry being taken from the meter readings at the customer's premises. At the filling manifold the actual weight of gas required to bring the cylinder up to 100 lbs. is entered under the heading Pounds Refill. It is a matter of instant recognition whether the figures in the two columns are identical, as they theoretically should be.

Tank Charts Are Checked

As a check on this particularly controversial aspect of metering, the writer was permitted to select at random two tank charts, one from the month of August, 1941, and one from the month of December, 1940. Each chart was full, and thus each accounted for 26 cylinders refilled, one batch under summer conditions and the other during winter weather. On the August chart a total of 2017 lbs. of propane were required to fill the 26 cylinders, each to its 100 lb. capacity; the total of all figures in the Pounds Over column was 24 and the total of all the figures in the Pounds Under column was 23. For the month of December the

Outside the loading platform at the bulk plant of L. L. Parlett, Waldorf, Md.



total of the Pounds Over column was three, and the total of the Pounds Under column was 35, out of a total of 2138 lbs. required to fill all of the cylinders to capacity.

In the opinion of the management, these records serve still another purpose. It is inevitable that occasional high bill complaints, based on the assumed inaccuracy of the meter, will be received. These can be answered instantly by displaying to the customer the amount of gas required to refill the cylinder and checking that figure with the amount used as shown by the meter readings.

Meter Readers Play Safe

Safety is a watchword throughout the Parlett organization, and the meter readers and their helpers are instructed to check every gas burning appliance in a house whenever a new cylinder is installed. If a call is made, necessitating a change of cylinders when the customer is not at home, the gas is left turned off. Thus the danger of an

unlighted pilot being left open is eliminated. It is necessary for the customer to phone the company when he returns, in order that his gas may be turned on without risk. This requires a 24-hour service, which the company maintains, but it is not too high a price to pay for a record of four years without a single accident stemming from the use of propane by any customer.

In October Mr. Parlett put into operation a plant at Indian Head, Md., which will serve 650 houses. This is a Government project. A master meter is used to determine the amount of LP-Gas used and the Government has piped the streets to each of the dwelling units. Plant capacity is 15,000 gals.

CALENDAR

February

L.P.G.A. Annual Convention—Muehlbach Hotel, Kansas City, Mo., Feb. 23-25.

May

L.P.G.A. Southern Section—Mayo Hotel, Tulsa, Okla., May 25-27.



After the two-day session of business and discussion, Midwest L.P.G.A.

Midwesters Consider

AT the meeting of the Midwest Section of the Liquefied Petroleum Gas Association, Inc., held at the Hotel Nicollet, Minneapolis, Minn., Nov. 13-14, new officers were elected for the coming year. These are: L. R. Forsyth, Omaha Blaugas Co., Omaha, Neb., chairman; Francis T. McCahill, Home Gas Co., Minneapolis, vice chairman, and Richard Verkamp, Verkamp Corp., Cincinnati, secretary.

Approximately 150 members registered at the meeting. Only representatives of companies which are bona fide members of L.P.G.A. were permitted to register. H. A. Goodwin, retiring secretary and

chairman of the membership committee, reported that with the exception of one company, all who are entitled to membership in L.P.G.A. in the Midwest Section territory, are now members.

C. O. Russell, retiring chairman, reported on the activities of the Midwest Section during the past year. F. R. Fetherston, national secretary L.P.G.A., addressed the group on "The Activities of the Association During the National Emergency." Watson E. Derwent, president of the A.G.A.E.M., presented a paper on "The Availability of Gas Appliances During the Emergency." The first day's ses-



G.A.
members relaxed at the closing banquet in the Hotel Nicollet, Minneapolis.

Emergency Problems

sion closed following a talk by F. B. Boice, of the Shell Oil Co., Inc., on "Our Gas Load After the Emergency." The technical and standards committee was in session the first morning and the greater part of the second day, headed by Walter Hoagland, of Shell Oil Co., Inc.

L. R. Forsyth, newly-elected chairman, presided over the luncheon, held the second day of the meeting. Edward F. Flynn, assistant to the vice president, Great Northern Railway Co., addressed the luncheon group on "Shores of Opportunity." H. Emerson Thomas, Phillips Petroleum Co., followed Mr. Flynn with a paper on "What

Those in L.P.G.A. Should Plan on for the Immediate Future."

L. L. Peters, of the American Stove Co., was unable to attend because of an automobile accident, but his paper "LP-Gas versus Electricity" was read by Lloyd Ginn, of the same organization. The last speaker at the meeting was Carl Sorby, who as chairman of the advertising committee of the L.P.G.A., presented a plan for a cooperative advertising campaign to be organized in the near future. Approximate expenditure of the campaign will be \$100,000. (For details, see Page 60 of this issue.)

No equipment was exhibited.

Development of LP-Gas Valves and Regulators

By HAROLD L. NORWAY

Engineer, LP-Gas Division, The Bastian-Blessing Co., Chicago

THE pioneers in the LP-Gas industry were confronted with many problems in obtaining proper equipment for handling the new product. The types of valves and regulators that would handle LP-Gases turned out to be two of the most important problems. The valves then in use for handling other compressed gases were of the stuffing box type and it was hoped that this style valve could be used in handling LP-Gases. Several thousand valves employing stuffing boxes (Fig. 1) were put in service on LP-Gas equipment and after a relatively short time, the inadequacy of this form of construction for handling butane and propane was disclosed. The valves would be leak-tight when first placed in service but would leak through the stuffing box a short time thereafter.

The first step in the actual design of equipment for LP-Gases was the application of a metal disc secured to the valve stem to serve as a diaphragm in prevent-



H. L. NORWAY

ing leakage around the stem. The thin metal disc was clamped around its outer circumference in the valve body and the flexing properties of the disc would permit the raising and lowering of the stem to open and close the valve. The valve opening was limited in some designs of the metal diaphragm but as propane was being handled in most cases, the vapor pressure was high enough to provide the required flows. The metal disc type of diaphragm valve (Fig. 2) solved the leakage problem for a period of two or three years, but in applications where the valves were operated frequently during this period, the discs began to fail as a result of metal fatigue.

A new synthetic material appeared on the market prior to the time the metal discs started to fail and the claims made for the material included petroleum applications. The Bastian-Blessing Co. immediately investigated the possibility of using the new synthetic material in connection with valves and other equipment designed for handling LP-Gases. The results of special tests substantiated the claims made for the material. The physical properties of the material made it suitable for applications where flexing and strength were required. A new valve was de-

signed to include a diaphragm made of the synthetic material, for in addition to providing a leak-tight construction, the new material also permitted an increase in the stem travel which resulted in a larger valve opening. The new valve was made available to the trade just about the time the metal discs started to fail. The fact that hundreds of thousands of valves employing synthetic diaphragms (Fig. 3) have been giving satisfactory service for a number of years in handling LP-Gases should be of special interest to all persons interested in the safe handling of this product.

White metal, hard rubber and synthetics have been accepted as the desirable materials for seat discs used in shut-off valves. The

advantages of any one material over another depend upon the application. The harder materials, white metal and hard rubber, will withstand more abuse in closing against the valve seat but when properly operated, the resilient synthetic disc has the advantage of providing a leak-tight closure even if some hard particles, such as small pieces of rust, lodge on the valve seat.

The hand wheel means of operation is recommended for valves with synthetic discs. Wrench type operation is commonly employed on valves with the harder discs. Either form of operation can be used with any disc if the operator is thoroughly acquainted with the valve construction and operation, but in the majority of cases the resilient disc will be damaged if the valve is operated by means of a wrench.

The Bastian-Blessing Co. designed a spring loaded relief valve that served as a safety device for I.C.C. shipping containers. This safety device originally was used in combination with the fusible plugs then required by the Bureau of Explosives. The spring loaded relief valve has been built integral with the cylinder valve for quite a few years and although it complies with the requirements of the Bureau of Explosives for safety devices for I.C.C. shipping containers, the practice in some cases is to provide a small fusible plug in addition to the spring loaded relief valve. In case of a fire around the container the relief valve will open and discharge the vapors until all liquid is vaporized.

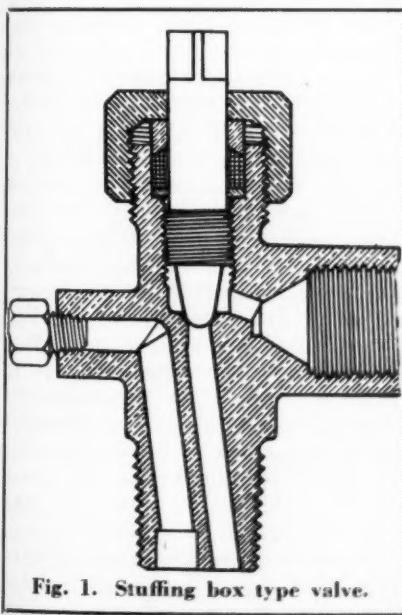


Fig. 1. Stuffing box type valve.

The residual pressure in the container after the relief valve closes will be released when the fuse plug melts.

The proper type of regulator for LP-Gas applications was another important problem confronting the pioneers in this industry. The regulators available at that time were of large sizes and the cost was excessive for small systems. The diaphragm material in the large regulators would not withstand the action of LP-Gases.

As was the case for LP-Gas valves, it was necessary to design special regulators for this new service. The material available for

diaphragms which was found to be resistant to the action of LP-Gases was super-sensitive rubber reinforced with fabric. The favorable service record after years of actual use is proof that the material is ideally suited for the job.

The white metal seat disc was considered for use in regulators but the test results showed that a more resilient material was necessary to provide the desired operating characteristics.

The advantages of cast iron for handling gases was proven by years of satisfactory service so the natural step was to use cast iron in building LP-Gas regulators. Castings were improved so that leak-tight cast iron bodies were available in lighter weights than would have been possible under ordinary casting methods.

A mercury seal initially was used to prevent high pressures to the appliances. This style of pressure relief served the intended purpose when filled with the correct amount of mercury and when properly maintained. The maintenance necessary to keep the mercury seals in proper working order was a problem when the installations increased to a large number. To solve this problem, The Bastian-Blessing Co. designed a spring-loaded diaphragm type of pressure relief valve to replace the mercury seal. Initially the diaphragm relief valve was made as a separate unit to permit installation on regulators in the field which were designed for attachment of a mercury seal. The majority of the low pressure regulators being manufactured today include an integral spring

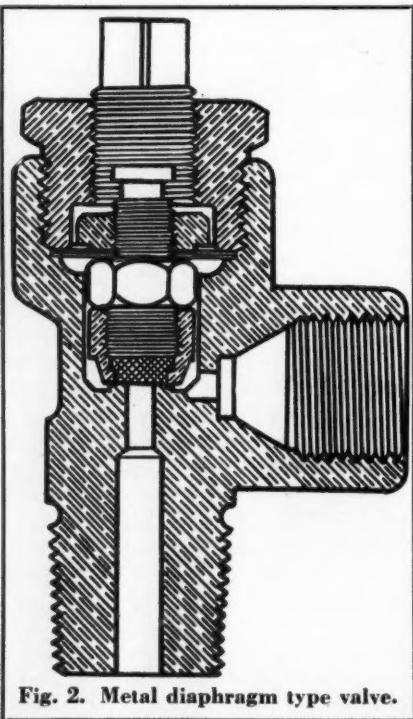


Fig. 2. Metal diaphragm type valve.

loaded relief valve with regulator.

The relief valve discharge and the vent for the space above the regulator diaphragm are arranged through one opening in the regulator body or bonnet to simplify installation. This is especially true where it is necessary to direct such discharge away from the regulator as would be the case if the regulator were installed indoors or closer than five feet to a building opening located below the regulator. This construction also permits the use of a single vent pipe on an underground system regulator to vent above the water in a flooded manhole.

Experience has indicated the need for protecting the regulator vent opening from becoming closed. Operators in many localities encountered regulator trouble when the vents were closed by dirt which was placed in the opening in the moist state by insects (mud-daubers). This type of trouble has been practically eliminated by providing a screen at the vent terminal. The screen still can become clogged with dirt so that it is necessary to maintain a proper inspection program and clean the screen as soon as any appreciable amount of dirt collects. The screen should not be removed to eliminate cleaning operations because the dirt then would collect inside of the regulator and although the vent would appear open, the closure would be inside where removal of dirt would be more difficult. Without a screen, it is impossible to inspect a regulator and determine whether dirt is collecting in the passage. In cases where the regulator vent is piped to a point away

from the regulator, it is just as important to screen the end of the line as it is to screen the regulator vent opening when no line is employed.

Even though LP-Gas regulators are carefully adjusted and set at the factory, the character of the installation may have a bearing on the delivery pressure at the appliances. When a regulator is set to deliver 30 cu. ft. of propane per hour at 11 in. water column pressure with 100 lb. inlet pressure, the user should not expect to obtain the 11 in. pressure at the appliances if the 30 cu. ft. load is delivered through a long length of small diameter tubing or pipe.

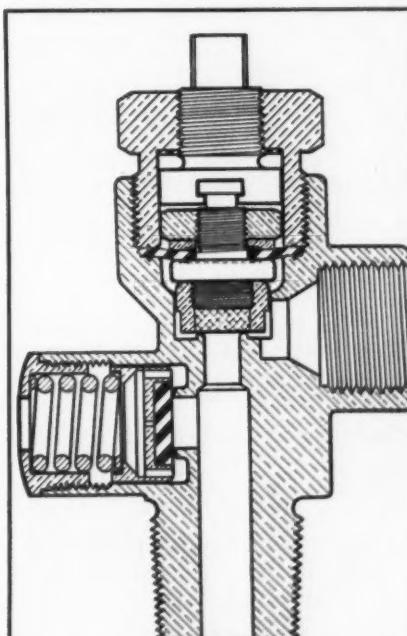


Fig. 3. Synthetic diaphragm type valve.

Northwest Is Host to L. P. G. A.

SEVENTY-FIVE members and guests of the Pacific Coast Section, Liquefied Petroleum Gas Association gathered in Portland, Oct. 24-25 to attend the Fall conference. The meeting, sponsored by the Pacific-Northwest District, was under

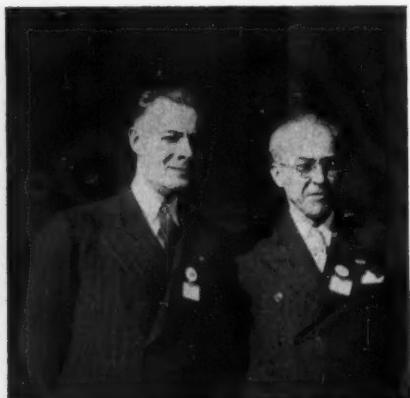
By PAUL LADY

professor of automotive engineering, Oregon State College, Corvallis, who has been active in promoting an acceptance of LP-Gas as a motor fuel in the Northwest.

Somewhat technical, but beneficial to the dealer interested in LP-Gas as a motor fuel, Mr. Paul's paper dealt with the "Optimum Air Requirements of Liquefied Petroleum Gases for Best Engine Economy and Power," the information based upon many experiments on air-fuel ratios in the laboratories of Oregon State College. A bulletin dealing in full with these experiments, has been prepared by the University, and was distributed to those attending the meeting.

Following the informal luncheon, a paper on "Relationship Between the Fuel Distributor and the Public Utility, Both Using LP-Gas," prepared by H. M. Thomas, president and general manager, Northwest Cities Gas Co., Walla Walla, Wash., was read by A. J. Anderson of that company.

Dealing with a problem which must be considered by every LP-Gas dealer, Mr. Anderson stated that the public utility and the LP-Gas dealer should not be competitive. Even though the utility must extend mains from time to time there is no reason why the two cannot work together, he pointed

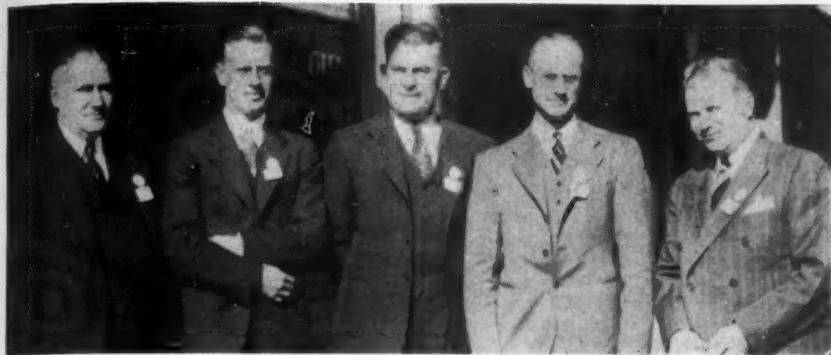


Carl Hopp, Steel Tank & Pipe Co., and C. A. Marsh, Multnomah Fuel Co. Mr. Marsh is sub-chairman of the Pacific Coast Section, L.P.G.A.

the direction of C. A. Marsh, chairman; Carl W. Hopp, program chairman and John Kunkel, secretary of the Pacific Coast Section.

Opening the Friday morning session with a welcome to delegates, Chairman Marsh reviewed the progress of the LP-Gas industry in the Pacific-Northwest. He stated that members in that area are happy to take an active part in Association activities.

The first paper on the program was given by W. H. Paul, associate



J. W. Cahill, Sasia & Wallace; I. S. Wilson, American Butane Corp.; L. D. Wallace, Sasia & Wallace; W. H. Paul, Oregon State College; Harold Smith, American Liquid Gas Corp.



Bart Taine, Al Lucas and Glen Zimmerman, Multnomah Fuel Co.; J. L. Rhodes, War Department; Don H. Slocum, Multnomah Fuel Co.; E. J. Peterson, Payne Furnace & Supply Co., Inc.



E. H. Cunningham, Western Gas Co.; H. L. Costello and Hal Flora, Standard Oil Co. of California.

out. The gas company is in a position to refer prospects wanting gas to the LP-Gas dealer. The action of dealers will help to determine the future course of utilities. Cooperation can be had—the main thing is to work together and get every possible customer for gas.

"Liquid Gas for Flame Cutting" was presented by Gene Rowe, Interstate Butane Equipment Co., Salem, Ore. Speaking on this subject with which he has had much experience, Mr. Rowe emphasized the importance of this market to dealers everywhere. A few of the highlights of Mr. Rowe's paper were: For steel cutting LP-Gas has many advantages over acetylene, especially for heavy cutting with thick steel. Propane is more economical than acetylene. The cut when using propane, is more even. Acetylene cylinders weigh much more, thus LP-Gas offers a big saving in transportation costs.

Motor Fuels Compared

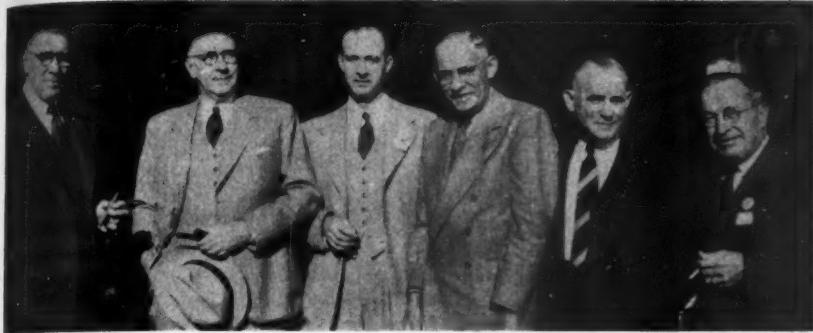
The final paper on the afternoon program dealt with "Carburization of Liquefied Petroleum Gases," and was presented by Harold W. Smith, American Liquid Gas Co., Los Angeles. Comparing LP-Gas with gasoline as a motor fuel, Mr. Smith showed how superior butane or propane can be when a proper installation is made on a suitable engine. One of the problems that has had to be met is the application of butane to motors designed specifically for gasoline, but developments in conversion equipment and engineering practices are meet-

ing this until engines are designed for butane.

Saturday's morning session was well attended by members and guests. A number of representatives from city fire and forestry departments were present to seek information on butane.

First paper on the program was presented by Tallent Ransome, Ransome Co., Emeryville, Calif. Speaking on "How LP-Gases Can Serve the National Defense," Mr. Ransome gave many ideas on the problems facing the industry today. Ours is the problem of a new industry that is becoming known and accepted, he pointed out. Our first job is to educate the country to our fuel. Industry needs our fuel badly and we must make it easily available. A great deal of our strength lies in the ability of our farms to produce. Here LP-Gas is important and offers a great domestic market. The extensive use of LP-Gas in army camps is helping to educate thousands to its value. Due to the great demands of defense, LP-Gas is playing an important role in industry and civilian life.

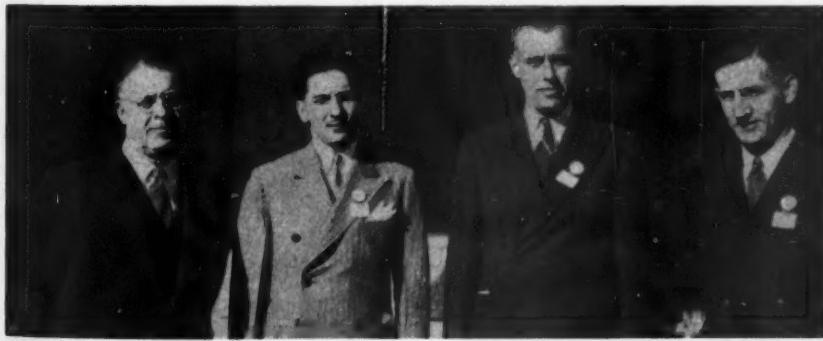
The final paper on the program was the often repeated and highly educational platform demonstration by M. B. Anfenger and Dr. O. W. Johnson, Standard Oil Co. of Calif., San Francisco, which deals with the "Physical Properties of LP-Gases." This paper presents a comprehensive study of physical characteristics of butane and propane. (For this paper, as formerly presented, see March and April, 1941, issues, BUTANE-PROPANE News.)



J. H. Lewis, Grayson-Robertshaw; C. M. Ambrose, Seattle Liquid Gas Corp.; Robert Poethig, The Bastian-Blessing Co.; Paul Melchart, Seattle Liquid Gas Corp.; J. A. Barr, Pressed Steel Tank Co.; J. S. Fagan, Mutual L.P. Gas Equipment Co.



J. W. Crane, Interstate Equipment Co.; Carl Golden, L. C. Roney, Inc.; E. A. Rowe, Interstate Equipment Co.; Floyd Hampson, Western Gas & Power Co.



E. A. Taylor, Oregon Deputy Fire Marshal; William Dominick, Pittsburgh Equitable Meter Co.; A. W. Heinz, Spokane United R.R.; I. R. Minzel, Butane Gas Corp.

Family "Washeterias" Open Doors for Home Gas Sales

A GOOD word of advice for butane or propane dealers might be "Watch for Washeterias," especially in the sections of the country where there are fewer individual owners of washing machines, for "Washeterias" are apt to thrive in sections of this character.

F. H. Greenwood, Butane Gas Sales Co., Denton, Texas, has one installation of this kind and will go after more now that he has some definite operating figures on which to base his actions and has seen how effectively butane is lightening the responsibilities of Mrs. Lee Brooks, operator of the Washeteria at Ponder, Texas, 10 miles from Denton.

But for those who may not have observed the Washeteria program developing, it should be mentioned that it is an establishment set-up in a village, small town or even in a city, where your wife, my wife or our neighbor's wife, who may not own a washing machine, can take the family washing and do it herself with modern equipment and plenty of hot water.

One washing machine official stated that a woman in West Texas developed the idea about 1930. Now there are said to be thousands of Washeterias. Many have just one machine and tubs, and there is record of those who operate up to 18 machines. The average number of washing machines per estab-

lishment estimated by the official of the washing machine company, however, is six machines per Washeteria.

Up until last May, Mrs. Lee Brooks, of Ponder, Texas, got her hot water supply from a wood burning boiler. But this method is entirely outdated with the coming of her butane installation, a Butane Equipment Co., Inc., system, and her 40-gal. Hotstream booster water heater.

Mrs. Brooks has the highest kind of praise for the performance of butane in this job and says that her customers tell her that the water is hotter now than it was before. Whether that is true or not, the butane system provides an easy control that she could never obtain before. Now her hot water is always on tap without firing up. Previously, the wood boiler had to be fired up even on rainy days just in case someone would want to do a washing. Butane has done away with the waste of fuel and provides a way to meet uncertainty.

Now look at the installation from Mr. Brooks, standpoint, for it is he who cut and hauled the wood and kept the home fires burning. He heaved a sigh of relief as he talked about the success of butane. In the wood-burning days he arose at 4:40 every morning to fire the boiler. Now he sleeps until 6 o'clock, shortly afterward assum-

ing his duties at the nearby gin or engaging in drayage contract work by means of a truck which he operates. He now figures it costs only three and a half cents per washing to heat the water with butane. The consumption of butane over a six weeks period has been approximately 125 gals., including the amount going into the butane range and into the firing of a small boiler used by a son in maintaining a cleaning and pressing business.

Mrs. Brooks' Washeteria is located in a wash shed in back of her home. She has accommodated as many as 65 family washings in a single week. She charges 35 cents

per hour for use of the equipment which includes a certain number of tubsful of hot water and of cold water. For excessive amounts she charges 10 cents extra per tubful of hot water and five cents for cold water. There is just one Washeteria in Ponder but in a village nearby there are three of them.

Look at it from one other point of view. If 65 housewives are becoming accustomed to using butane and to the desirability of having hot water always on tap; and if—well, anyway, good luck, Mr. Greenwood! Let's see how many of these prospects you can eventually get on your books.



Mrs. Lee Brooks, of Ponder, Texas, demonstrates the operation of one of the washing machines operating in her Washeteria.

SELLING

Market Surveys

To have a "beaten path to your door" in this day of competition, it is not enough to build or sell a "better mouse-trap." In fact, it is not enough even to make this "better mouse-trap" known to the public. The most successful efforts of advertising offices of today go further than merely announcing a product; they are designed to serve some specific purpose, the character of which will depend upon the nature of the task at hand. The ultimate task of advertising is, of course, to sell merchandise.

While the old selling psychology was primarily concerned with methods of *overcoming* the customers' sales resistance, the new psychology is to crystallize the wants of the consumers and then concentrate on how to *avoid* sales resistance.

Therefore, it is obvious that to plan an advertising campaign that will give maximum benefits, adequate market investigation is first necessary. The questions in the investigation should be so constructed that the dealer will learn the extent of the profitable consuming market and the cost of reaching it; how well known is the product; the buyer's brand preferences; the extent of competition; the personal feelings (gas-mindedness) of the public, and, to a cer-

tain extent, the crystallization of the wants of the consumer.

Unless the town is very small, questionnaires will be necessary to "feel out" the public. A cross section of the territory may be taken by any one of several ways. Of these, the personal interview is best and a lot can be accomplished by one man in one or two days. Don't use salesmen to take the survey as it is natural for them to influence the person through speech or manner. The salesman's opinion isn't wanted.

Surveys by telephone are good, and by far the quickest, but the questions must be simple and direct. Explain briefly that you are taking a survey and give assurance that there is no obligation.

Surveys may be taken by mail by using a printed, mimeographed or multigraphed, double, government card, one half of which is to be torn off and returned. The answers should require no more than a check mark as even with such a small inconvenience only from five to 20 replies may be expected out of each 100 sent.

Regardless of the method used never request signatures or identification of the one being interviewed and better results will be obtained if goodwill is built for the questionnaires by informing the subjects a few days in advance by a brief note telling the survey.

Always take a cross section of the territory and limit the questionnaire to six or seven short questions. Keep an accurate tabulation of the answers and after a comprehensive study has been made and the immediate advertising and merchandising problems determined, don't throw the poll away, as the information is as valuable for the salesmen as it is in planning the advertising campaign. Prospects can be found in no better way.

Sales Viewpoints

"The proper viewpoint," said a very successful salesman, "can be the means of concluding favorably almost every interview." It is because of different viewpoints that we have wars, feuds, domestic squabbles, friendly debates and—sales resistance.

"The proper viewpoint from which to overcome sales resistance is the prospect's viewpoint. If the salesman will just bend down, look through the same colored glasses the prospective customer is wearing, he will see the solution to the sales problem and will be able to present it in an agreeable manner.

"The prospective buyer rarely resents a salesman if he feels the salesman is honestly trying to see his point of view, but if the salesman tries to warp the prospect's mind to see his standpoint or high pressure him into a sale, it very often results unfavorably; then, the prospect is not in the proper mood for further discussion. He will not admit anything, will give any kind of an excuse for not buying, and

at times even be rude in an effort to get rid of the caller."

Usually an eventual buyer will defend himself with true statements for not buying. By showing the prospect, through the prospect's own color of glasses, that the problems may be overcome, is the pleasant and most effective way of doing business.

Suppose the hopeful "hasn't the cash." Remember, that he probably honestly believes he hasn't. By keeping this viewpoint in mind you can dispel it by making a trade-in offer on the old stove and quoting monthly payment rates within his means. Show him, through a budget system designed for his approximate income, just how these payments may be met. If it's "too much money," quote prices of other merchandise that favorably reflects your product; stress quality features, or other selling points that your stove has.

If her "old stove is good enough" compare the old and the new feature-by-feature; show the loss of heat and fuel on an old fashioned oven; discuss pride of ownership, coolness, style, domesticity, saving of time, and other selling points known to every salesman. If she isn't sure she wants a gas range "because Mrs. So-and-So likes her electric stove so well," show her the advantages of gas cookery, how easy the stove is to clean even after boil-overs, stress safety, comfort, efficiency and economy.

There are two viewpoints to every problem—try to see the customer's and he will be more likely to see yours.

THE BOTTLED GAS MANUAL

Chapter 6

Manual and Automatic Regulator Manifolds

WHEN we purchase an automobile we either purchase *transportation* or *transportation plus*. The *plus* items are the radio, cigar lighter, ash tray, clock, heater, defroster and similar gadgets. They are not necessary to transportation but they add to comfort and convenience.

Likewise, we can furnish our customers with *gas service* or *gas service plus*. *Gas service* may be furnished with a single bottle of gas and a simple regulator. *Gas service plus* calls for anything from a means of quickly shifting from one bottle to another up to completely automatic and uninterrupted service. Some operators use a single cylinder with a regulator and a meter or weighing device, and a means of temporarily connecting into the system of a small cylinder is provided, thereby giving the customer uninterrupted service if the human element does not fall down on the job. Other operators prefer the dual or multiple cylinder systems with their many possible services. Combinations of both systems are possible.

Our discussion of these systems has nothing to do with their economic or sales merits. We are merely interested in how they work, and how to keep them working.

Multiple Cylinder Installations.

The principle upon which all multiple cylinder systems operate is that only one-half of the cylinders installed are in use at any one time. The balance is held in reserve, and the customer knows when one-half of his gas supply is exhausted—either by cessation of service in the case of manually operated manifolds, or by an indicating dial on the automatic manifolds. When this occurs the customer is supposed to notify his supplier to replenish the empty side of the system.

Manually Operated Multiple Cylinder Installations. There are three general types of manually operated multiple cylinder systems. These are as follows:

- A. Simple Discharge Manifold Systems.
- B. Check Manifold Systems.
- C. Manual Two-Way Manifold Systems.

The latter is available in two types:—

1. Those applied externally to the simple regulator.
2. Those built into the simple regulator body.

Simple Discharge Manifold Sys-

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- The Bottled Gas Manual series by C. C. Turner, started in the July, 1941, issue of BUTANE-PROPANE News and will continue to be published monthly in chapter form until completed. This series constitutes a valuable text book and field manual that should be invaluable to everyone in the liquefied petroleum gas industry.—Editor.

tems. The simplest type of this system consists of a nipple which is screwed into the inlet side of the simple regulator, and onto this nipple a common malleable or brass pipe tee is screwed. Each other entrance to the tee is connected by a "pig tail" to a cylinder or battery of cylinders. In operation, all of the cylinder valves connected to one side of the tee are closed. Those connected to the other side are opened. When this side of the system is exhausted it is necessary for the customer to first make sure that all appliance valves and pilots are shut off. It is then necessary for him to close the valves on the exhausted cylinders and open those on the other side of the system. After this has been done it is then necessary to re-light all pilot lights as well as those burners which he desires to have in operation.

Fig. 6* illustrates a simple manifold block which is extensively used for this purpose. The 907 male P.O.L.[†] connection connects into the inlet side of the simple or stripped regulator. Pigtails connect the two female No. 970 P.O.L. inlets to the cylinders on each side of the system. If the construction of the simple regulator does not provide a female 970 P.O.L. connection on the inlet side, the male P.O.L. connection may be removed from the block and a brass pipe nipple is then substituted for it.

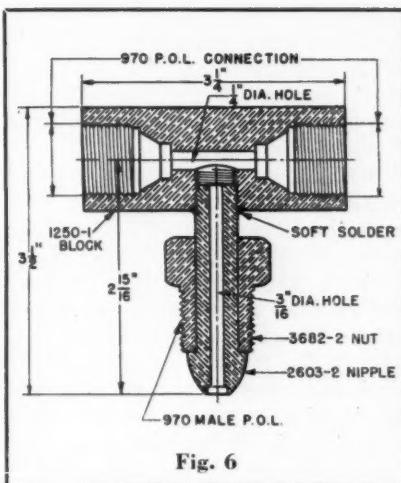


Fig. 6

Advantages and Disadvantages of Simple Discharge Manifold Systems. There are two advantages to this type of system. From the operator's standpoint there is the matter of low initial cost. From the customer's standpoint there certainly is no doubt about his knowing when one side of the system is exhausted, and therefore there is no excuse for his failing to order a replacement supply.

The disadvantages of this type of system lie first in the inconvenience of shifting from one side of the system to the other. Secondly, the system must be completely shut down each time that it is shifted from one side to the other, or when a replacement supply is installed. In the third place, there is the danger that the customer may forget to shut off some appliance burners and pilots when shifting from one side to the other, with the result that unburned gas may escape into the building.

* The author wishes to express his appreciation to the Bastian-Blessing Co. for permission to use Figures Nos. 6, 7, 8, and 13 which appear in Chapter 6. The first five figures in this regulator series appeared in Chapter 5 in the November issue of BUTANE-PROPANE News.

[†] Prestolite left-handed connections.

Disc or Slug Check Manifold Systems. The second *plus* step is in the installation of a slug or disc check in place of the simple manifold block. Such a check of the disc type is illustrated in Fig. 7. It will be noted that the general construction of this valve is very much the same as that of the simple block excepting that there is a floating disc (designated by part No. 2133-8) in between two seats. Let us imagine pressure being applied to the right hand side of this block and nothing connected to the left hand side. The pressure would cause the disc to be pressed against the left hand seat, as shown, thereby preventing gas escaping from the open left hand side.

Some operators resort to the questionable practice of terming such an installation as automatic. It is true that if the pressure drops on one side of the system the pressure from the other side of the system will close off the low pressure side by causing the disc to shift. The pressure, however, is bound to

become lower on the side that is in service, and the net result is that the disc shifts back and forth, and both sides of the system will be exhausted almost simultaneously.

Advantages and Disadvantages of Disc or Slug Check Manifold Systems. Pretty much the same advantages and disadvantages apply to this type of system as to the simple discharge manifold systems excepting that when a replacement supply of gas is connected to the system it is not necessary to shut it down. Another questionable advantage is that the customer does not have to close the valves on the discharged side before opening the valves upon the reserve side.

At this point it might be well to inject a word of caution. There are occasions when only one side of a system is connected and some operators take the chance of depending only upon the check valve to keep the open side shut off. Either a P.O.L. plug should be screwed into the open side of the check valve, or a P.O.L. cap screwed onto the end of the pigtail. While valves of this type are quite reliable they have been known to leak or stick. *Don't take a chance!*

Manual Two-way Manifold Systems. We progress further towards *plus* service by substituting a two-way manifold valve for either of the devices previously described. Such a valve is illustrated in Fig. 8. The 970 P.O.L. male connection is not shown in this sketch as it is placed on the opposite side of the valve from that shown and it connects with that portion shown as the ".022" area. By the turning of lever 2621-3 the valve stem is raised

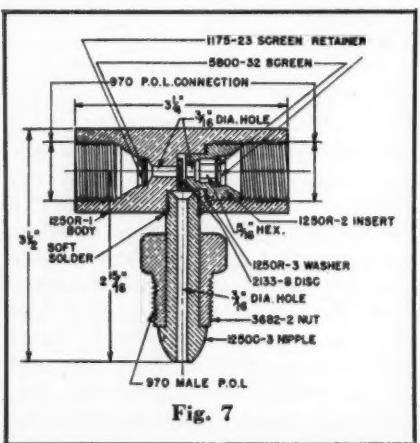


Fig. 7

or lowered. This valve stem is connected to the 2621-11 diaphragm stem through diaphragm 3713-4, the purpose of which is to prevent leakage of gas around the valve stem, and to provide a positive seal. Onto diaphragm stem 3713-4 is connected 2800-8 disc retainer in which is placed No. 2821-9 disc. The 2800-8 disc retainer is connected to 2821-8 disc retainer by No. 2621-4 disc connecting rod, and in the 2821-8 disc retainer is placed another 2821-9 disc. These 2821-9 discs face each other and are intended to bear against two seats at opposite ends of the "022" area passage. It will be noted that by rotation of lever 2621-3 the entire valve assembly is raised or lowered by means of threads, and that either one of the 2821-9 discs may be in contact with its valve seat when the valve assembly is at the respective extremities of its movement, but that both discs are not in contact with their respective seats at the same time. It also will be noted that both discs are *not* in contact with their respective seats when the valve assembly is not at one or the other extremity of its movement.

When the service man delivers a supply of gas the cylinder valves on both sides of the system are left open and lever 2621-3 is left at one extremity of movement. When one side of the system is exhausted the customer merely has to move lever 2621-3 to its other extremity of movement, thereby shutting off the exhausted side of the system and turning on the reserve side.

Advantages and Disadvantages of the Manual Two-way Manifold

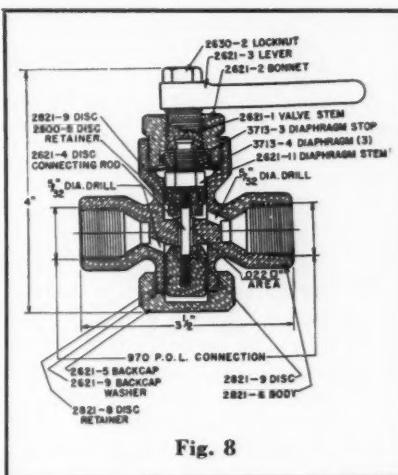


Fig. 8

System. The advantages of the manual two-way manifold system are very much the same as those of the disc or slug check manifold systems excepting that the customer does not have to manipulate the cylinder valves. The principle disadvantage is the same as that of all manual systems—the customer may forget to shut off all appliances before making a shift from one side of the system to the other, and if this is done and the system has shut down because of exhausting the supply in one side there is the ever present danger of unburned gas escaping into the building through open gas cocks or unlit pilots if not of the safety type.

A Safety Device That is Most Essential. A precautionary device such as the automatic cut-off valve could be placed in the individual gas line supplying each appliance. These valves function when there is an interruption of service, and they must be re-set manually be-

fore the appliance can be put in operation again. This serves as a very effective reminder to the customer to turn off all gas cocks before attempting to re-light them after such an interruption.

Many operators feel that while such a device is a valuable precaution in connection with manual systems it is not necessary with automatic systems. However, the best of automatic systems may fail, and because of the usual reliability of such systems the customer is quite in ignorance of their operation; therefore, the automatic cut-off valve is also a valuable precaution for them.

The Respective Merits of External and Built-in Two-way Manifold Systems. There has been much controversy between advocates of these two types of regulators. Those who believe in the external type of two-way manifold valve point out that if anything goes wrong with the manifold valve it is much easier to get at it for repairs or replacement. They also point out that to change from a manual to an automatic system it is merely necessary to install the correct diaphragm spring on the simple regulator and exchange manifold assemblies.

Against these arguments those who believe in the built-in two-way manifold valve point out that there are less joints and connections for leaks, that the cost of an integral unit is less than that of an assembled one, and that in the event of repairs or replacements which concern the manifolding the entire system has got to be shut down anyway!

From the service man's angle

there is not much choice. While it is possible to repair a regulator in the field it is best to replace a defective unit with one that you know is all right, then do your repairing and adjusting in a shop where you have the proper facilities and an opportunity to test your work without bother to the customer.

Service Problems of Manually Operated Multiple Cylinder Installation. There is not much that can go wrong with manually operated systems. The problems of the simple regulator we have covered in Chapter 5. Occasionally the male or female section of a P.O.L. connection may be damaged by misuse, and there are re-seating tools on the market which make possible a quick repair. A disc check valve may stick or leak because of foreign matter under the seat. First try dislodging the foreign matter by subjecting the valve to air pressure from the leaking side. If this does not do the trick, try washing it out with gasoline and then quickly drying it by passing a stream of air through it. If neither method is effective it is best to send the valve back to the manufacturer for repairs. Two-way manifolds seldom give any trouble, and when they do it is for one of two reasons. If there is leakage around the valve stem then the diaphragm is defective and must be replaced. If the valves leak, then there is foreign matter on the seats or the seat discs are defective, and must be replaced. Either trouble requires the disassembly of the valve for correction. This is a simple problem requiring only ordinary mechanical ability. It is recommended that the service

man shall request a blueprint from the manufacturer covering each piece of equipment which he has occasion to service, as a discussion of all types of these valves would require more space than can here be allowed.

Evolution of Automatic Pressure Differential Manifolds. Let us imagine that we have a cast iron box such as is shown in Fig. 9. D and D' are diaphragms cemented to this box over 2-in. diameter round holes. "B" is an inlet to this box. If pressure is applied at "B", diaphragms D and D' will stretch an equal amount into d and d' positions.

Supposing that we wished these two diaphragms to reach their distended position at 5 lbs. and 10 lbs. of gage pressure respectively. The area of a 2-in. circle is 3.1416 sq. in. If we wished to have diaphragm D distend to d position at 5 lbs. pressure we would have to create a force of $5 \times 3.1416 = 15.708$ lbs. to oppose the pressure beneath the diaphragm. If we wish to have diaphragm D' distend to d' position at 10 lbs. pressure we would have to create an opposing force of $10 \times 3.1416 = 31.416$ lbs. Such a condition is illustrated in Fig. 10.

We will now carry our idea farther and as in Fig. 11, attach to D and D' a valve stem and valve washer which on distention of the diaphragms causes the washers to press against holes in the body casting. Let us now imagine a bottle of gas connected to inlet B and one connected to inlet B'. When the pressure within the chamber rises to 5 lbs. per sq. in., diaphragm D will distend to d position, thereby

causing valve v to close. When the pressure within the chamber rises to 10 lbs., diaphragm D' will distend into d' position and close valve v'. If at any time the pressure in the chamber drops below 10 lbs. per sq. in., valve v' will open until such a time as the pressure again reaches 10 lbs. If the pressure within the chamber drops below 5 lbs., not only will valve v' first open, but valve v as well.

In Fig. 12 we add an outlet "O" and a gage "G". The gage is graduated for 10 lbs. pressure, and the first 5 lbs. of pressure are printed in red with the word "Reserve" under them. From 5 lbs. to 10 lbs. the gage is printed in green and the word "Service" appears in this section. If the indicating arrow is between 5 lbs. and 10 lbs. we know that only valve V' is open, and that gas is entering the manifold only from this side. If the indicating arrow drops below 5 lbs. we know that valve V has opened, and that gas is being drawn from this side as well. In other words, the bottle connected to B' would be drawn down to below 5 lbs. pressure, before the bottle connected to B would cut in.

By simply reversing the weights, placing the 31.416-lb. weight on diaphragm D and the 15.708-lb. weight on diaphragm D' we would then reverse the action of the manifold, B becoming the service side of the system and B' becoming the reserve side.

In the above proceedings we have created a crude automatic pressure differential manifold, and our next step is to a finished product such as that illustrated in Fig. 13. Here

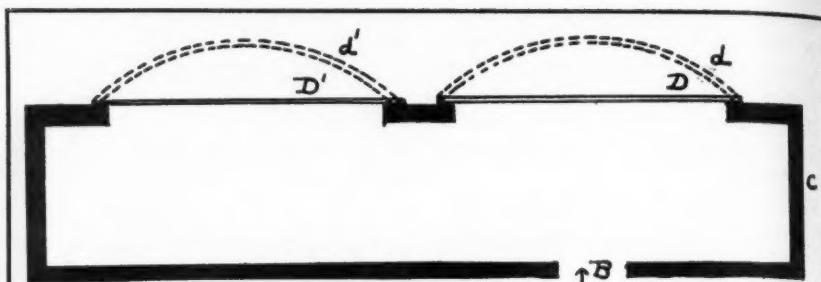


Fig. 9

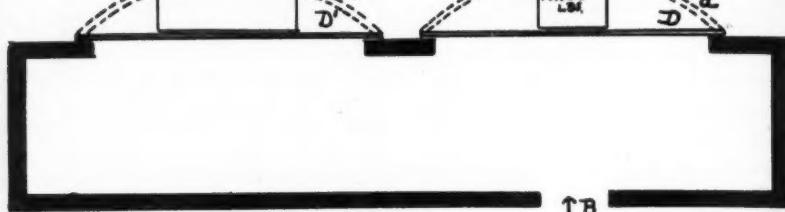


Fig. 10

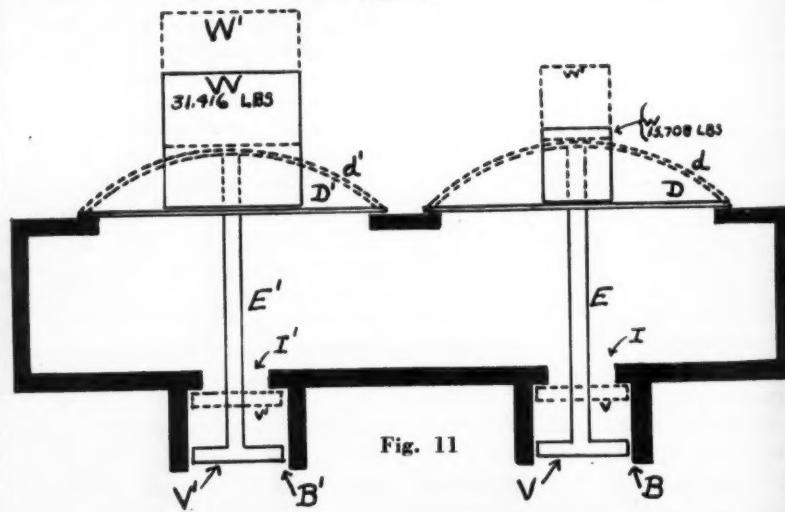


Fig. 11

the diaphragms are loaded by No. 2520-4 springs instead of a weight. Adjustment of the loading is accomplished by turning in or out on knurled spring cap No. 2120-4, thereby increasing or decreasing the force exerted by the spring. Changing of the service side of the assembly from one valve to the other is accomplished by shifting bar No. 2520-6. It will be noted that a chambered section of this bar bears against No. 2120-3 spring depressor. If in the sketch the bar should be shifted to the right it would press down on No. 2120-3 spring depressor, thereby creating a greater force on diaphragm No. 2520-3 and requiring greater pressure to close the valve.

Methods of Loading Pressure Differential Manifolds. By "load-

ing" we mean the force exerted on the diaphragms to keep the valves open until the desired pressure is reached in the chamber below the diaphragms. This is accomplished either by weights or by springs. One popular make uses a sliding ball weight on a rod which is pivoted between the two valves. The rod may be swung so that the weight exerts its force on either diaphragm. Another model employs a rotating cam in which there is an adjustment so that the high pressure loadings may be equalized. Still another make uses a quadrant with a cam ground into its under-surface. The underlying principle in all of these is the same—the increasing of the force exerted by either one of the springs so that one side of the manifold

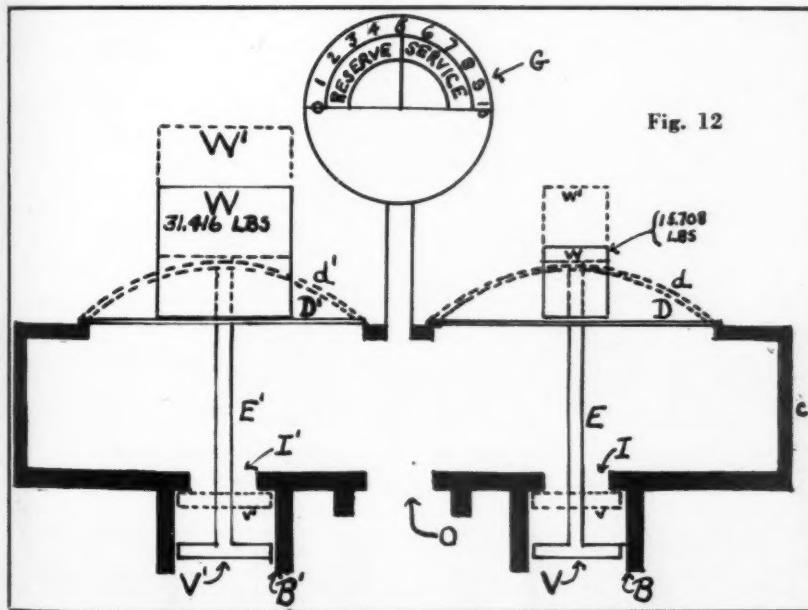
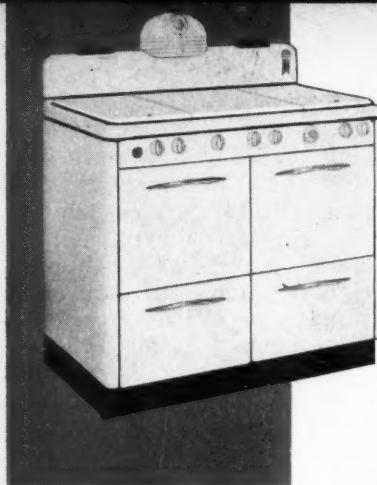
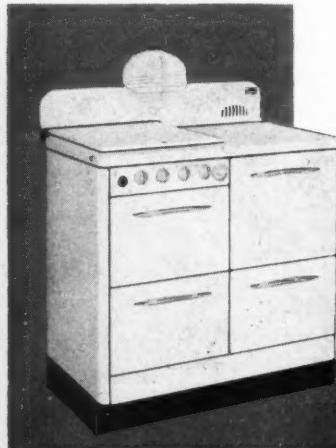


Fig. 12



GRAND CHAMPION RB 10

No finer gas range at any price. Six-burner Flexitop for any cooking need. "Charcolator" high broiler and dozens of other exclusive features every housewife wants.



CONVENTIONAL TOP MODEL RB 3

A 37-inch range; 16" x 19" x 13 $\frac{1}{4}$ " oven. Exclusive top lamp with handy built-in time reminder. Two simmer burners. Flush-to-floor base. Robertshaw Oven Heat Control. 2 large storage drawers.



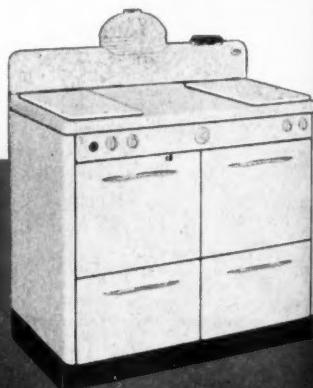
SELL GRAND . . . the range that is engineered for superior performance with L. P. Gas. Sell GRAND . . . the compact line with a model to suit every woman's need at the price she wants to pay. Sell GRAND . . . the PROFIT line of the L. P. Gas Range field!

● LEAKAGE PREVENTED . . .

Every joint and valve is specially sealed, and tested for the particular type of L. P. Gas that is to be used.

● NEW ECONO-SPEED BURNERS . . .

Their positive lighting means quicker lighting on all burners . . . reducing gas wastage. More efficient . . . easy to clean.



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Full 40-inch width; 18" x 19" x 13 $\frac{1}{4}$ " oven. One-piece cooking top. Large storage compartment and drawer. 1 Giant, 2 Simmer burners. Flush-to-wall — flush-to-floor construction.

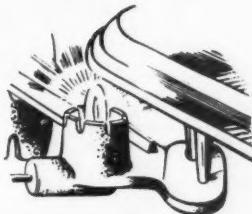
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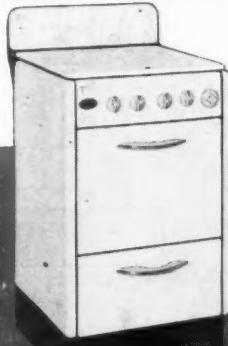
• **NON-EXTINGUISHABLE SAFETY OVEN PILOT . . .** Drafts can't blow it out, nor can opening or closing drawers or oven door. Made entirely of cast iron and so placed that it will maintain 100% efficiency through many years of service.

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PEEK-A-BOO MODEL RB 65

Full 37", divided top range. 16" x 19" x 13 $\frac{1}{4}$ " Peek-A-Boo Oven. All-porcelain broiler; 2 roomy storage drawers. Exclusive top lamp with built-in timer. Flush-to-floor base.



GRAND COOKER MODEL RB 11

22" cooker with 4-burner top. Burner centers 10" apart. Oven: 18" x 19" x 13 $\frac{1}{4}$ ". 2 simmer burners. All porcelain broiler. Flush-to-floor base.

R **EVERY PURSE, EVERY PURPOSE**

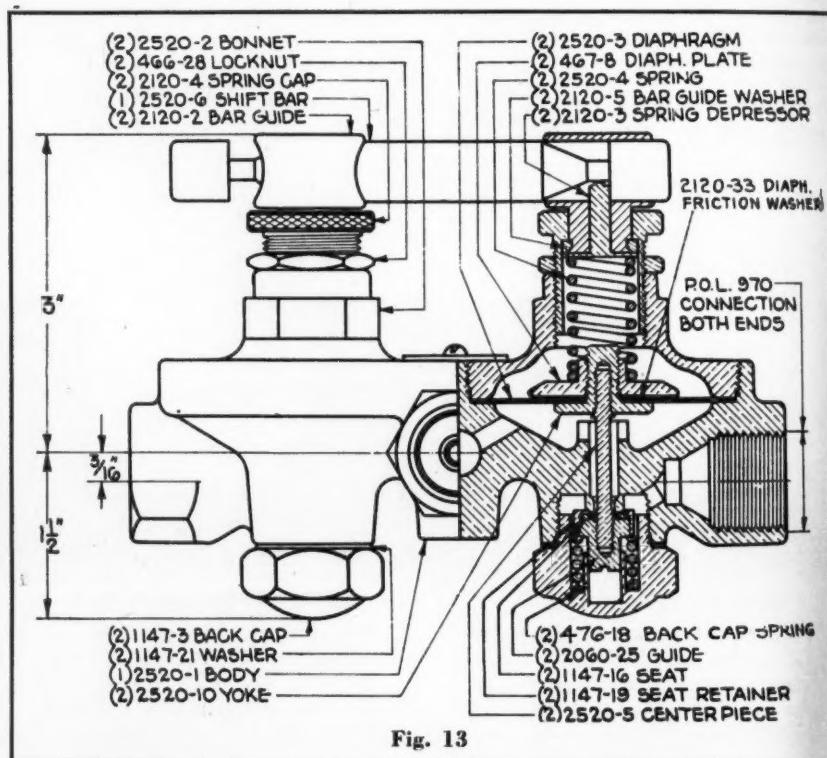
will be in service while the reserve side is shut off.

What Should the Differential Pressure Settings Be? This is a matter which depends upon the design of the regulator and depends upon a number of factors among which are:

- A. The area of the diaphragm.
- B. The area of the valve seat.
- C. The linkage leverage between the diaphragm and the valve seat.
- D. Stiffness of the springs used.
- E. Design of the device for creating different spring forces.

Generally speaking, the low pressure setting should be as low as

practically possible, for lowness of the reserve operating pressure in the manifold permits a lower service operating pressure, and a low service operating pressure keeps the system longer on the service side of the system in extremely cold weather or in case of excessive loads. Many systems operate on settings of 10 lbs. and 5 lbs. pressure—others on 12 lbs. and 6 lbs. Some use 15 lbs. and 7½ lbs. Before attempting to set the pressures on an automatic pressure differential manifold the service man should first know the recommendations of the manufacturer for the



BANKS TANKS DOMINATE

On The Assembly Line



By

W. W. BANKS

The Butane-Propane Handbook, a new issue of which is coming off the press soon, performs a real serv-

ice to the industry and is worthy of our support. In the brochure announcing the forthcoming issue I notice that from 1932 to 1940 the number of domestic consumers for LP-Gas has increased 880%. That's something!

LP-Gas industry is America's fastest growing industry with more than one million families using it for cooking, water heating, refrigeration and space heating. That means that all of us must move fast to keep abreast of such phenomenal progress.

Quoting the above mentioned brochure further, the 325,000 new consumers last year represented an estimated volume of \$48,750,000 in equipment and appliances. That's something too!

We Manufacture All Types of Tanks

In addition to Economy Butane Systems we manufacture all types of Truck Tanks, Bulk Storage Tanks, Skid Tanks, Butane Motor Fuel Tanks, Smoke Stacks, Breechings, Steel Plate Fabrications. We are distributors for Scaife Cylinders, and Tru-Flame Butane Gas Ranges.



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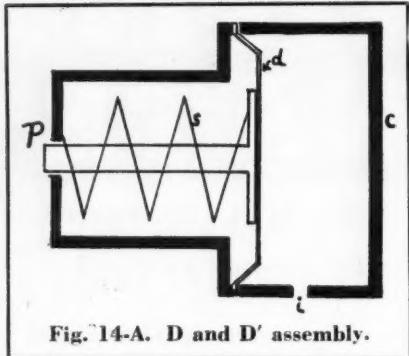


Fig. 14-A. D and D' assembly.

particular mode that he is servicing.

Equalization of Manifold Pressures. Probably the greatest headache for operators who use pressure automatic differential manifolds is this matter of pressure equalization, and that is no fault of the manufacturer, but comes from carelessness of the service man or ignorance of the system. The purpose of an automatic manifold is to provide continuous service, therefore we are most interested in *when* the system shifts from the service to the reserve cylinders. If the low pressure settings of both sides of the manifold are not equalized and the gage arrow is not properly set it is entirely possible for the system to shift onto the reserve side and the arrow still be over the service side of the gage. Every service man should have a pressure gage reading up to 20 lbs., and this should be connected into the system in place of the regular gage while adjustment is being made. Let us say that the low pressure setting recommended by the manufacturer is 5 lbs. The high pressure side of the system should

be disregarded and both sides of the system adjusted accurately to a reserve pressure setting of 5 lbs.

On many pressure differential manifolds there is no provision for the adjustment of high pressure settings, the manufacturer relying on accuracy in grinding the cam device. Furthermore, a difficulty which is encountered in making both a high and low pressure adjustment is the finding of two identical springs, for usually two springs made of the same material and under the same conditions will vary somewhat in the amount of force which they will exert under the same compression. Where there is a provision for equalizing the high pressure settings this should be done after the low pressure setting is made, and the low pressure side of the system should be disregarded while this is being done.

After the system has been properly equalized the regular gage should be re-installed and the indicating arrow set so that it will be over the reserve section of the dial when the system is on reserve.

Service Problems of Automatic Pressure Differential Manifolds. Little if any trouble will be experienced with these manifolds if they are properly equalized when installed. A few troubles are listed below, and it will be found that these cover most complaints:

Complaints and probable causes:

1. Gage arrow differs in service position for the two sides of the system.

High pressure settings are not equalized. It may or may not be possible to correct this, as it depends upon whether or not there is

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Enjoy the best of holiday business by featuring Roper gas ranges. Then look ahead to 1942. The Roper organization plans to stay on the job. Protect your future by tying to a company that appreciates the Liquefied Petroleum Gas industry and plans to "keep 'em cooking with L. P. gas."

Exclusive Features

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a provision for adjustment. If there is such a provision and it is still impossible to equalize, the probable cause is two unequal springs. Replace with balanced springs.

2. Gage arrow differs in reserve position for the two sides of the system.

Low pressure settings are not equalized. Can be corrected by adjustment as described in Paragraph on "Equalization of Manifold Pressures."

3. Gage arrow differs in service setting on the same side of system.

If system is not overloaded beyond the capacity of the bottles to vaporize and maintain pressures above the manifold pressure settings, the causes may be:

A. Temperature too low to permit bottle pressures sufficiently high.

B. Effect of temperature on diaphragm or spring.

C. Leakage in the manifold valves.

4. Gage arrow differs in reserve setting on same side of system.

Same conditions as in No. 3 above.

5. Gage fails to register.

May be plugged gage line or defective gage.

6. Bottles last longer on one side of the system than on the other.

Leakage in the valve on the reserve side of system. Also possible that manifold pressure settings are not equalized.

7. Both sides of system exhaust simultaneously on one side of the system but not on the other.

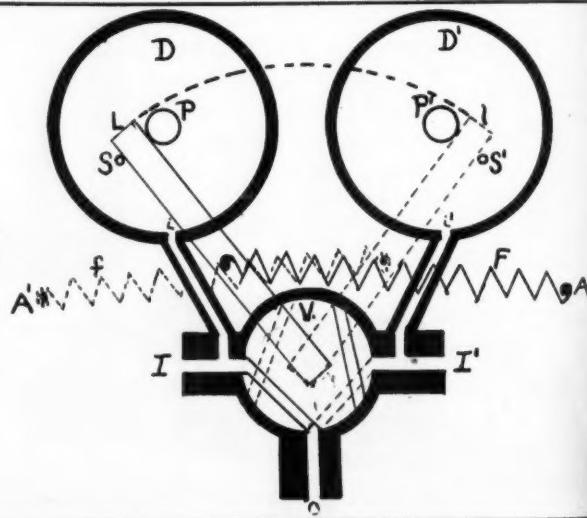
Leakage in manifold valve on reserve side of system when this occurs. Also possible that manifold pressure settings are not equalized.

8. Both sides of system exhaust simultaneously regardless of side on service.

Both manifold valves leaking when in reserve position. Also possible manifold pressure settings are not equalized.

In event of the troubles listed

Fig. 14-B. Trigger release automatic manifold.





The cook can't forget to set the Robertshaw heat control. She *must* set it in order to turn on the gas! One single motion does both jobs. Another single motion turns the gas off and returns the setting to zero. It couldn't be simpler—or surer!

*The simpler the control,
the easier to use,
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ROBERTSHAW

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under 6, 7, and 8 the customer is quite apt to accuse the operator of delivering unfilled tanks, and to demand an adjustment. A thorough understanding of the system is necessary on the part of the person handling this complaint and the ability to explain simply and convincingly that such is not the case and that the customer has received full benefit of the cylinder contents although the manifold has not operated properly.

Does an Automatic Pressure Differential Manifold Leave Any Gas in the Cylinders on the Exhausted Side of the System? Statements to this effect are often made by competition. The answer to this is, not any more so than in a manual system, and we have already covered this matter in Chapter 4. A study of the valve operations under varying pressures will quickly refute such a statement. When the system shifts onto the reserve side, the service side valve is *still open*. When the pressure in the reserve bottles drops below the reserve setting, that valve remains open. It will be noted that if the system is allowed to completely exhaust itself both valves are open for the reason that pressure closes them—lack of pressure allows them to remain open — therefore, a n automatic manifold of the pressure differential type does not create any back pressure or restriction to complete exhaustion of the cylinders other than friction of the gas itself in passing through the ports in the manifold, and the bottles on both sides of the system will completely exhaust themselves to atmospheric

pressure if they are so permitted.

The Proper Procedure in Replacing Empty Bottles On An Automatic Pressure Differential Manifold System. Let us return to Fig. 12 for a moment. Let us suppose that bottles connected to the B' side of the system are exhausted, and the system is operating on bottles connected to the B side. Then valve V' is open at all times. If we should disconnect the bottles from B' an opportunity for the unrestricted flow of gas would be provided, and as the pressure could not build up within the manifold to close either valve V or V', gas would escape from B' in considerable quantities while we were changing the cylinders. If, however, we first shifted W from D' diaphragm to D diaphragm and w from D diaphragm to D' diaphragm the pressure within the manifold would build up to 10 lbs., thereby closing valve V' at 5 lbs. pressure. We could then disconnect bottles from B' without any gas escaping.

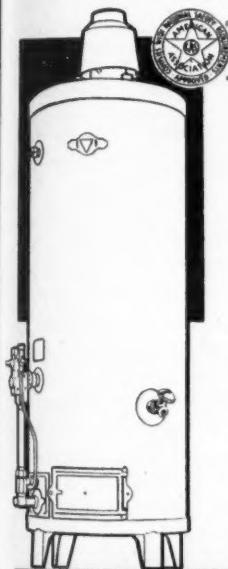
The proper procedure to follow when the service side of the system is exhausted is as follows:

1. First close cylinder valves on exhausted bottles on the service side of system.
2. Move the shifting mechanism so that the side of the system on which bottles are being replaced becomes the reserve side.
3. Disconnect empty bottles and replace with filled ones.
4. See that all cylinder valves are open after the change has been made.

Advantages of Automatic Pressure Differential Systems. All automatic manifolds provide for uninterrupted service, but the particu-

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lar advantage of automatic pressure differential manifold, is that if the draw on the system becomes greater than the ability of the bottles to vaporize, then the system will shift over temporarily onto the reserve side until such a time as the service side has had an opportunity to recover. Manifolds of this type are also simple, have fewer parts than automatics of the "trigger release" type, and therefore cost less to manufacture. They also cover up the sins of many an operator in failing to provide a sufficient number of cylinders for proper vaporization on heavily loaded systems.

Disconnected Side of the System Should Always be Plugged. There are occasions when bottles are only installed upon one side of an automatic pressure differential system. At such times the opposite side of the system should be plugged. If the system is not plugged on the unused side it is necessary to operate with the connected side in service position, and the shifting of the bar by any person would permit large and dangerous quantities of gas to escape. Furthermore, if the temperature should drop so that the pressure in the connected cylinders became less than the reserve setting, the reserve valve would open, allowing gas to escape. Play safe—don't allow an unconnected side of a system to be unplugged.

Trigger Release Automatic Manifolds. Trigger release automatic manifolds are nothing more or less than a manual two-way manifold with a device for shifting the lever from one position to the

other. Such a device is shown in Fig. 14-A and 14-B and its operation is as follows:

Let us imagine the valve assembly "V" shown in Fig. 14-B to be of somewhat similar construction to the two-way manifold illustrated in Fig. 8. In Fig. 14-B the number 2621-3 is represented by lever "L". "D" and "D'" are diaphragm plunger assemblies as illustrated in Fig. 14-A. When pressure is applied at "I", diaphragm "d" pushes against the force of spring "s", causing plunger "P" to protrude through the housing casting. When the pressure drops below the force of the spring the plunger returns to a position flush with the housing casting.

In Fig. 14-B lever "L" is prevented from responding to the pull of spring "F" by plunger "P". Cylinder pressure, applied at "T" passes out through the opening "O" into a simple regulator. When the cylinder pressure connected to "T" drops below the force exerted by the spring "s" (shown in Fig. 14-A) plunger "P" is pulled back flush with the housing casting, allowing "L" to go to "I" position against stop-pin "S" under the tension of spring "F". Gas will then flow from "I" out through "O" and "I" will be shut off.

To re-set, this manifold spring "F" is merely transferred from its anchorage on post "A" to post "A'", and "D'" then becomes the service side of the system.

While the trigger release automatic manifold shown in Fig. 14-B is entirely theoretical in design, it operates on the principle of all regular manifolds of this type.

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3 Eliminate non-profitable installations. You cannot afford to tie up equipment on installations that use only a very limited amount of gas such as those in service only a few months of the year. Adopt a service charge plan or utilize the regulators on more profitable installations.

4 Economize on regulators by changing over multiple drum installations to single drum units wherever possible. In other words spread out your available control assemblies and accessories as far as you can.

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Many manufacturers include the valve "V" in the body of the regulator itself.

Advantages of Trigger Release Automatic Manifolds. While manifolds of the trigger release type do not permit shifting back and forth from side to side of the system in event of an overload they do have the advantage of making it imperative that the operator shall install sufficient cylinders for proper vaporization on each job. It will also be noted that these systems handle the entire reduction of pressure in one stage, and it is therefore possible to temporarily increase their capacity for unexpected demands by supplying some type of auxiliary heat to the cylinders for vaporization purposes. For this reason they are particularly adapted to certain types of small industrial installations.

Metered Gas Installations. Any one of the systems herein described can be made into a metered installation by use of a meter between the simple regulator and the load appliances.

The most common metered system consists of a simple regulator and one bottle of gas. Adjacent to the outlet of the regulator a shut-off valve is placed, and between the meter and this valve there is placed a tee fitting with a shut-off valve fastened to the leg of the tee and a hose connection screwed into the valve. When a cylinder is nearly exhausted and a new one is to be placed upon the system the service man first connects to the hose connection a 20-lb. cylinder with demonstrating regulator attached. He

then opens the valve on the 20-lb. cylinder, opens the valve screwed into the tee and closes the valve next to the regulator. The large bottle can then be removed without interruption of service. After the new bottle has been attached to the system the service man opens the valve on it, then opens the valve adjacent to the regulator and closes the valve screwed into the tee. He then closes the valve on the 20-lb. cylinder and removes the hose from the hose connection. The changeover has been completed.

If we have absorbed everything in this evening's session we have travelled far on our journey into the bottled gas field. Let's call it "quits" for tonight, but tomorrow let's go over all of the points again and again until we thoroughly know all of these important facts about the very heart of a bottled gas installation.

First, however, determine how much you have absorbed by asking yourself the following questions on this chapter. Then turn to Page 104 for the correct answers.

Questions on Chapter 6

1. Name the three types of manually operated multiple cylinder installations.
2. What is the principle danger of a manually operated multiple cylinder installation?
3. What safety device could be installed in connection with each gas outlet to guard against customer's failure to shut off appliance valve at time of changing cylinders?



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O. 4713C OUTFIT

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4. What are the two most common methods of loading pressure differential springs?

5. If the gage on an Automatic Pressure Differential Manifold is defective how can you tell whether or not the Service side of the system is exhausted?

6. What is the proper procedure in replacing exhausted bottles on an Automatic Pressure Differential Manifold system?

7. If an Automatic Pressure Differential Manifold system is suddenly subjected to an overload beyond the ability of the Service cylinders to vaporize—what happens?

8. If this happened when the Service side was exhausted what would the result be?

9. How could such a condition be temporarily relieved?

10. Why is a shut-off valve on the main line between the regulator and the appliances desirable in any system?

(*Chapter 7 of THE BOTTLED GAS MANUAL will appear in the January issue, BUTANE-PROPANE News.*)

Bottled Gas Manual Chapter 4 Correction

In order to meet certain mechanical limitations, a number of rows and columns of figures were omitted from the cut of Fig. 12, Chapter 4, Page 50, The Bottled Gas Manual, in the October, 1941, issue of BUTANE-PROPANE News. The table was entitled, "Pounds of Liquid Propane in Standard 100-lb. Cylinder at Various Filled Heights and Temperatures."

The omission of figures above the

"heavy black line" and the key phrase that that line indicated the maximum allowable filling levels of cylinders constituted an unintended misrepresentation. It is the series of omitted figures above the black line that show overfilled cylinders. The figures first below the black line do not represent maximum weights, for the full cylinder always weighs 100 lbs., but the height of the 100 lbs. of liquid in the cylinder and the number of gallons will vary according to temperatures.

To correct any misimpression, we have reproduced on the opposite page the enlarged table just as it was drawn by C. C. Turner, author of the series, except that lack of space still prevents extensions showing changes occurring under temperatures ranging above 100°, which the original contained.

All who are making use of this manual or are filing the series for later reference, should tear out from this issue this new Table 12 (now on Page 59) and substitute for or paste it over Table 12, Page 50, of the October issue.



George E. Whitwell Heads Laboratories Committee

Succeeding Nils T. Sellman, assistant vice-president, Consolidated Edison Co. of New York, Inc., George E. Whitwell, vice-president in charge of sales of the Philadelphia Electric Co., has been appointed chairman of the Laboratories Managing Committee of the American Gas Association.

With the exception of Raymond M. Connor, director of the Testing Laboratories, Mr. Whitwell is senior member of this committee in years of service. He was appointed in July, 1928, at the time the Cleveland Laboratories made their first major expansion and the new Laboratories building was erected. He has served continuously since that date.

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TABLE II. POUNDS OF LIQUID PROPANE IN STANDARD 100-LB CYLINDER AT VARIOUS FILLED HEIGHTS AND TEMPERATURES

FIGURES ABOVE HEAVY BLACK LINE INDICATE AN OVER-FILLED CYLINDER.

PROPANE CYLINDER LIQUID TEMPERATURES, DEGREES FAHRENHEIT.

		LIQUID PROPANE IN STANDARD 100-LB CYLINDER AT VARIOUS FILLED HEIGHTS AND TEMPERATURES									
		LIQUID PROPANE IN STANDARD 100-LB CYLINDER AT VARIOUS FILLED HEIGHTS AND TEMPERATURES									
		-40°	-35°	-30°	-25°	-20°	-15°	-10°	-5°	0°	+5°
		-	-	-	-	-	-	-	-	-	+10°
		-	-	-	-	-	-	-	-	-	+15°
		-	-	-	-	-	-	-	-	-	+20°
		-	-	-	-	-	-	-	-	-	+25°
		-	-	-	-	-	-	-	-	-	+30°
		-	-	-	-	-	-	-	-	-	+35°
		-	-	-	-	-	-	-	-	-	+40°
		-	-	-	-	-	-	-	-	-	+45°
		-	-	-	-	-	-	-	-	-	+50°
		-	-	-	-	-	-	-	-	-	+55°
		-	-	-	-	-	-	-	-	-	+60°
		-	-	-	-	-	-	-	-	-	+65°
		-	-	-	-	-	-	-	-	-	+70°
		-	-	-	-	-	-	-	-	-	+75°
		-	-	-	-	-	-	-	-	-	+80°
		-	-	-	-	-	-	-	-	-	+85°
		-	-	-	-	-	-	-	-	-	+90°
		-	-	-	-	-	-	-	-	-	+95°
		-	-	-	-	-	-	-	-	-	+100°
40	37.4%	27.37	18.4	18.17	18.0	18.0	18.0	18.0	18.0	18.0	18.0
40	38.6%	26.65	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9
50	35.9%	25.94	17.5	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4
50	37%	23.22	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
50	38.5%	24.51	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
50	39.4%	23.79	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
50	39.9%	22.36	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
50	41%	21.65	18.47	18.47	18.47	18.47	18.47	18.47	18.47	18.47	18.47
50	41.5%	20.93	18.13	18.13	18.13	18.13	18.13	18.13	18.13	18.13	18.13
50	42%	20.22	18.17	18.17	18.17	18.17	18.17	18.17	18.17	18.17	18.17
50	42.5%	19.50	18.44	18.44	18.44	18.44	18.44	18.44	18.44	18.44	18.44
50	42.9%	18.79	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48	18.48
50	43.4%	18.17	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46	18.46
50	43.9%	17.54	18.44	18.44	18.44	18.44	18.44	18.44	18.44	18.44	18.44
50	44.4%	16.92	18.42	18.42	18.42	18.42	18.42	18.42	18.42	18.42	18.42
50	44.9%	16.30	18.40	18.40	18.40	18.40	18.40	18.40	18.40	18.40	18.40
50	45.4%	15.68	18.38	18.38	18.38	18.38	18.38	18.38	18.38	18.38	18.38
50	45.9%	15.06	18.36	18.36	18.36	18.36	18.36	18.36	18.36	18.36	18.36
50	46.4%	14.44	18.34	18.34	18.34	18.34	18.34	18.34	18.34	18.34	18.34
50	46.9%	13.82	18.32	18.32	18.32	18.32	18.32	18.32	18.32	18.32	18.32
50	47.4%	13.20	18.30	18.30	18.30	18.30	18.30	18.30	18.30	18.30	18.30
50	47.9%	12.58	18.28	18.28	18.28	18.28	18.28	18.28	18.28	18.28	18.28
50	48.4%	11.96	18.26	18.26	18.26	18.26	18.26	18.26	18.26	18.26	18.26
50	48.9%	11.34	18.24	18.24	18.24	18.24	18.24	18.24	18.24	18.24	18.24
50	49.4%	10.72	18.22	18.22	18.22	18.22	18.22	18.22	18.22	18.22	18.22
50	49.9%	10.10	18.20	18.20	18.20	18.20	18.20	18.20	18.20	18.20	18.20
50	50.4%	9.48	18.18	18.18	18.18	18.18	18.18	18.18	18.18	18.18	18.18
50	50.9%	8.86	18.16	18.16	18.16	18.16	18.16	18.16	18.16	18.16	18.16
50	51.4%	8.24	18.14	18.14	18.14	18.14	18.14	18.14	18.14	18.14	18.14
50	51.9%	7.62	18.12	18.12	18.12	18.12	18.12	18.12	18.12	18.12	18.12
50	52.4%	7.00	18.10	18.10	18.10	18.10	18.10	18.10	18.10	18.10	18.10
50	52.9%	6.38	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08	18.08
50	53.4%	5.76	18.06	18.06	18.06	18.06	18.06	18.06	18.06	18.06	18.06
50	53.9%	5.14	18.04	18.04	18.04	18.04	18.04	18.04	18.04	18.04	18.04
50	54.4%	4.52	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02	18.02
50	54.9%	3.90	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
50	55.4%	3.28	17.98	17.98	17.98	17.98	17.98	17.98	17.98	17.98	17.98
50	55.9%	2.66	17.96	17.96	17.96	17.96	17.96	17.96	17.96	17.96	17.96
50	56.4%	2.04	17.94	17.94	17.94	17.94	17.94	17.94	17.94	17.94	17.94
50	56.9%	1.42	17.92	17.92	17.92	17.92	17.92	17.92	17.92	17.92	17.92
50	57.4%	0.80	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90	17.90
50	57.9%	0.18	17.88	17.88	17.88	17.88	17.88	17.88	17.88	17.88	17.88
50	58.4%	-0.50	17.86	17.86	17.86	17.86	17.86	17.86	17.86	17.86	17.86
50	58.9%	-1.12	17.84	17.84	17.84	17.84	17.84	17.84	17.84	17.84	17.84
50	59.4%	-1.74	17.82	17.82	17.82	17.82	17.82	17.82	17.82	17.82	17.82
50	59.9%	-2.36	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80
50	60.4%	-2.98	17.78	17.78	17.78	17.78	17.78	17.78	17.78	17.78	17.78
50	60.9%	-3.60	17.76	17.76	17.76	17.76	17.76	17.76	17.76	17.76	17.76
50	61.4%	-4.22	17.74	17.74	17.74	17.74	17.74	17.74	17.74	17.74	17.74
50	61.9%	-4.84	17.72	17.72	17.72	17.72	17.72	17.72	17.72	17.72	17.72
50	62.4%	-5.46	17.70	17.70	17.70	17.70	17.70	17.70	17.70	17.70	17.70
50	62.9%	-6.08	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68
50	63.4%	-6.70	17.66	17.66	17.66	17.66	17.66	17.66	17.66	17.66	17.66
50	63.9%	-7.32	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.64
50	64.4%	-7.94	17.62	17.62	17.62	17.62	17.62	17.62	17.62	17.62	17.62
50	64.9%	-8.56	17.60	17.60	17.60	17.60	17.60	17.60	17.60	17.60	17.60
50	65.4%	-9.18	17.58	17.58	17.58	17.58	17.58	17.58	17.58	17.58	17.58
50	65.9%	-9.80	17.56	17.56	17.56	17.56	17.56	17.56	17.56	17.56	17.56
50	66.4%	-10.42	17.54	17.54	17.54	17.54	17.54	17.54	17.54	17.54	17.54
50	66.9%	-11.04	17.52	17.52	17.52	17.52	17.52	17.52	17.52	17.52	17.52
50	67.4%	-11.66	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
50	67.9%	-12.28	17.48	17.48	17.48	17.48	17.48	17.48	17.48	17.48	17.48
50	68.4%	-12.90	17.46	17.46	17.46	17.46	17.46	17.46	17.46	17.46	17.46
50	68.9%	-13.52	17.44	17.44	17.44	17.44	17.44	17.44	17.44	17.44	17.44
50	69.4%	-14.14	17.42	17.42	17.42	17.42	17.42	17.42	17.42	17.42	17.42
50	69.9%	-14.76	17.40	17.40	17.40	17.40	17.40	17.40	17.40	17.40	17.40
50	70.4%	-15.38	17.38	17.38	17.38	17.38	17.38	17.38	17.38	17.38	17.38
50	70.9%	-16.00	17.36	17.36	17.36	17.36	17.36	17.36	17.36	17.36	17.36
50	71.4%	-16.62	17.34	17.34	17.34	17.34	17.34	17.34	17.34	17.34	17.34
50	71.9%	-17.24	17.32	17.32	17.32	17.32	17.32	17.32	17.32	17.32	17.32
50	72.4%	-17.86	17.30	17.30	17.30	17.30	17.30	17.30	17.30	17.30	17.30
50	72.9%	-18.48	17.28	17.28	17.28	17.28	17.28	17.28	17.28	17.28	17.28
50	73.4%	-19.10	17.26	17.26	17.26	17.26	17.26	17.26	17.26	17.26	17.26
50	73.9%	-19.72	17.24	17.24	17.24	17.24	17.24	17.24	17.24	17.24	17.24
50	74.4%	-20.34	17.22	17.22	17.22	17.22	17.22	17.22	17.22	17.22	17.22
50	74.9%	-20.96	17.20	17.20	17.20	17.20	17.20	17.20	17.20	17.20	17.20
50	75.4%	-21.58	17.18	17.18	17.18	17.18	17.18	17.18	17.18	17.18	17.18
50	75.9%	-22.20	17.16	17.16	17.16	17.16	17.16	17.16	17.16	17.16	17.16
50	76.4%	-22.82	17.14	17.14	17.14	17.14	17.14	17.14	17.14	17.14	17.14
50	76.9%	-23.44	17.12	17.12	17.12	17.12	17.12	17.12	17.12	17.12	17.12
50	77.4%	-24.06	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10
50	77.9%	-24.68	17.08	17.08	17.08	17.08	17.08	17.08	17.08	17.08	17.08
50	78.4%	-25.30	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06
50	78.9%	-25.92	17.04	17.04	17.04	17.04	17.04	17.04	17.04	17.04	17.04
50	79.4%	-26.54	17.02	17.02	17.02</						

L.P.G.A. Plans Big Ad Campaign

THE Liquefied Petroleum Gas Association is making plans to conduct a national advertising and promotional program in 1942, according to an announcement by George Bach, president, at the Midwest section convention in Minneapolis, Nov. 13.

Members of the executive board approved a presentation submitted by Carl Sorby, chairman of the sales promotion and advertising committee, recommending that immediate steps be taken to raise a fund of more than \$100,000 to conduct the national campaign.

Many Commitments Made

A large number of commitments have already been received by Mr. Sorby from producers, distributors and manufacturers of appliances and equipment. It is anticipated that the entire fund will be raised prior to the annual convention to be held in Kansas City next February.

The advertising and promotion campaign will feature the comfort and convenience of LP-Gas in domestic use on the farms, in the suburban areas and in communities which have no other gas service. The national program will be the first step to bring the LP-Gas industry before the public in national magazines.

The sales promotion and advertising committee will soon meet with special representatives of the committee in every section of the

country and begin an intensive campaign to raise the necessary funds. The regional chairman will be appointed with special sub-chairmen for each state.

"We are sailing with full steam ahead to bring LP-Gas to the attention of every prospective customer in the country," said Mr. Sorby.

Members of the committee are: Carl Sorby, Geo. D. Roper Corp., Rockford, Ill., chairman; F. W. Frost, Carbide & Carbon Chemicals Corp., New York; J. H. DeLoria, Skelly Oil Co., Kansas City, Mo.; H. K. Strickler, Propane Corp., Erie, Pa.; R. J. Canniff, Servel, Inc., Evansville, Ind.; G. M. Rhode, Jr., Ruud Manufacturing Co., Pittsburgh, Pa.; R. L. Edwards, Edwards Gas Appliance Co., San Antonio, Texas; B. D. Geroy, Illinois Bottled Gas Co., Chicago; M. L. Baker, Standard Oil Co. of Calif., San Francisco.

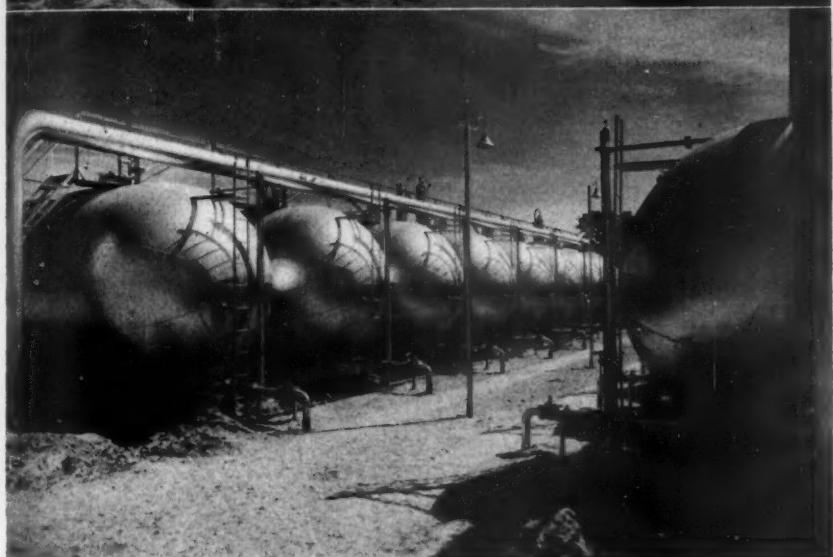


Howard Cuppernoll Dies, Wife Will Continue Business

Howard Cuppernoll, owner and manager of Howard's Butane Gas Co., Seiling, Okla., died recently from burns received from an accident. Mr. Cuppernoll was alone when the accident occurred and the cause was not learned.

Mrs. Cuppernoll, formerly bookkeeper of the concern, will continue the business which serves the communities of Seiling and Woodward, Okla.

A 5000-gal. bulk plant is located at Seiling and additional storage provided at Woodward. Two delivery trucks complete the equipment. Salesmen for the company are Charles Saunders and Charles Stowers.



**Builders of Modern Pressure Storage,
API—ASME Code, for the Industry.**

MORE THAN A QUARTER CENTURY
OF DEPENDABLE FABRICATION

WYATT METAL & BOILER WORKS

HOUSTON AND DALLAS, TEXAS

wyatt's

Sales Officials Are Indian Chiefs

By E. B. VONEMAN

Montana-Dakota Utilities Co.,
Minneapolis, Minn.

THE Montana-Dakota Utilities Co., Minneapolis, finds that concentrated sales drives pay dividends. Two major sales campaigns are conducted each year — April, May and June and September, October and November. Definite themes are used for the contests with prospectuses prepared and presented to most of the organization.

Fine rivalry is built up between 11 divisions with interest kept alive through the medium of a bulletin issued to employes each week. The "Legion of Honor" contest conducted last spring produced excellent results.

The spring campaign also made it possible for one employe from each division to attend the annual sales meeting with all expenses paid. The selection was made by the employe group of each division on the basis of general interest in the campaign shown by the employe, prospects handed in, contributions to the weekly bulletin, etc. These employes made up the "Legion of Honor" and received



Three officials of the Montana-Dakotas Utilities Co., and one factory representative were made honorary chieftains of the Sioux Indian tribe in the Black Hills, S. D., in August. Identified by their "store clo'hes" in the above picture, they are (left to right): R. M. Haskett, "Chief Yellow Bear"; W. L. Hays, "Chief Conquering Bear"; J. C. Schmidauer, "Chief Brave Heart," and E. B. Voneman, "Chief Short Bear."

ASK RANSOME



If your plant is operating on "surplus gas," and you see a "shut-off notice" on the horizon, a Butane Standby Plant may be the answer to your problem.

Ask Ransome, if you would like full details on the advantages of Butane for industrial and municipal standby plants.

We not only design such plants, but we are prepared to erect them. We also manufacture a complete line of Butane torches and burners.

If there is anything you wish to know about the use of Butane—ask Ransome!

RANSOME COMPANY

Designing and Constructing Engineers

4030 HOLLIS STREET • EMERYVILLE, CALIFORNIA

Ransome

special recognition during the sales meeting.

In recent years the company has been selling LP-Gas appliances, also, and these sales have materially increased the total volume.

The sales meeting was held August 18, 19 and 20 in the Black Hills, S. D., with 80 employees of the company as well as 75 manufacturers in attendance. Nearly 60% of the group brought their wives and all sessions of the three day business meetings were open to those wives. Celebrating the 25th anniversary of the beginning of the sales department, the opening of the meeting was a playlet of the "first sales meeting" which was held in Chisholm, Minn., on Nov. 6, 1916. The same five people that attended the first meeting 25 years ago were the characters taking part in the skit. Those five people are still connected with the company. They are R. M. Heskett, vice president; W. L. Hayes, sales manager; A. P. McDonald, engineer; Anna Murphy McGee, secretary to Mr. Heskett in 1916; and W. A. LaFrance, assistant manager of the Kenmare, N. D., division.

Indian Pow-Wow Witnessed

One afternoon was left free for touring through the Black Hills and parties were arranged each evening for all the group. The final night saw the annual banquet and entertainment, at which time announcement was made for the fall campaign, the "Silver Anniversary Campaign." The first night saw a huge Indian pow-wow up in the Black Hills. During the evening three of the officials from the Min-

neapolis office of Montana-Dakota Utilities Co. and one factory representative were taken into the Sioux tribe, made honorary chieftains and presented with beautiful eagle feather headdresses. Those men are R. M. Heskett, "Chief Yellow Bear"; W. L. Hayes, "Chief Conquering Bear"; J. C. Schmidtauer, "Chief Brave Heart", and E. B. Voneman, "Chief Short Bear".

The Silver Anniversary Campaign continues until Nov. 30 and it is anticipated that 1941 will be one of the best merchandise years in the history of the company. The company property includes outlets in North and South Dakota, Wyoming and Montana.



American Gas Association Elects Officers for 1942

More than 1800 leaders of gas utilities from every section of the United States gathered in Atlantic City, N. J., on Oct. 20, to register for the opening sessions of the 23rd annual meeting of the American Gas Association.

New officers and directors elected at the convention are as follows:

President: George S. Hawley, president, The Bridgeport Gas Light Co., Bridgeport, Conn.

Vice President: A. F. Bridge, vice president and general manager, Southern Counties Gas Co., Los Angeles, Calif.

Treasurer: Ernest R. Acker, president, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.

Directors—Two Year Terms: Walter C. Beckjord; C. M. Cohn; Watson E. Derwent, vice president; George D. Roper Corp.; Ralph L. Fletcher; R. H. Hargrove; D. A. Hulcy; Bruno Rahn; Louis Rythenburg, president, Servel, Inc.; E. J. Tucker, and H. Carl Wolf.

It was decided that next year's annual meeting of the association will be held in San Francisco, during the week beginning Oct. 5, 1942.

"Faster than any Pump we have ever used"

The Southeastern Natural Gas Corporation of Miami, Fla., needs speedy service to supply its mushrooming list of customers. And the Moyno L.P.G. Pump, fitted to the chassis of the streamlined tank truck shown below, fills cylinders with propane "two or three times faster than any pump ever used before."



More than 2,000,000 pounds of gas have been handled since the pump was installed last November. It has performed daily with only minor adjustments. As a result, orders for four more R & M Moyno Pumps have been received.

Investigate the new Moyno L.P.G. pump for your butane-propane handling job. It is revolutionary in principle . . . valveless, self-priming, positive in displacement, delivering uniform flow without turbulence or vapor lock. Write today for descriptive folder and prices, specifying whether you handle butane or propane or both.

L.P.G. MOYNO PUMPS



ROBBINS & MYERS, Inc.

MOYNO PUMP DIVISION



SPRINGFIELD, OHIO

Program Committee Appointed For Southern Section Meeting

The Southern Section of the Liquefied Petroleum Gas Association, under the chairmanship of K. H. Koach, Sarasota, Fla., has begun preparations, earlier than ever before, for the Spring meeting of the Section to be held in Tulsa, Okla., May 25-27 at the Mayo hotel.

The program committee has been appointed and is now actively engaged in an effort to make the Tulsa meeting one of great value to the industry. Members of the committee are: W. A. Baden, Anchor Petroleum Co., Tulsa, chairman; H. W. Manley, Barnsdall Oil Co., Tulsa; Fred LaFortune, Warren Petroleum Co., Tulsa, and Jerry Brennan, Phillips Petroleum Co., Bartlesville, Okla.

It is expected that those who attend the convention will have an opportunity to visit one or more refineries in the Tulsa area and thus to obtain some first-hand knowledge about the product they sell.



A.G.A. Laboratories Publish Two New Research Bulletins

"Principles of Gas Storage Water Heater Design for Maximum Hot Water Delivery," (Bulletin No. 12) constitutes the second bulletin completed on domestic gas water heating research by the American Gas Association Testing Laboratories. Subdivided into two sections, the first covers a study of the influence of heat application to water heating vessels in producing stratification or separation of hot and cold water during heating periods. The second covers the effectiveness of dip tube design or other methods of introducing cold water to the storage vessel for accomplishing a separation of hot and cold water during draw periods.

Bulletin No. 14, "Fundamentals of

Automatic Flash Tube Lighter Design," represents the first attempt to publish scientific information on this subject. It also constitutes the third bulletin on domestic gas range research.

Copies of these bulletins may be obtained at nominal cost from the American Gas Association Testing Laboratories, 1032 East 62d St., Cleveland, Ohio.

Annual inspections at plants of gas appliance manufacturers throughout the United States and Canada were initiated in September by the Laboratories.

In addition to factory visits, inspections will be made in warehouses where gas appliances are stored, in department stores and on dealers' sales floors. Visits are also occasionally paid to consumers' homes for the purpose of checking not only individual appliances but their installation as well.



A. W. Jones, of Standard Gas, Goes With O.P.M., Washington

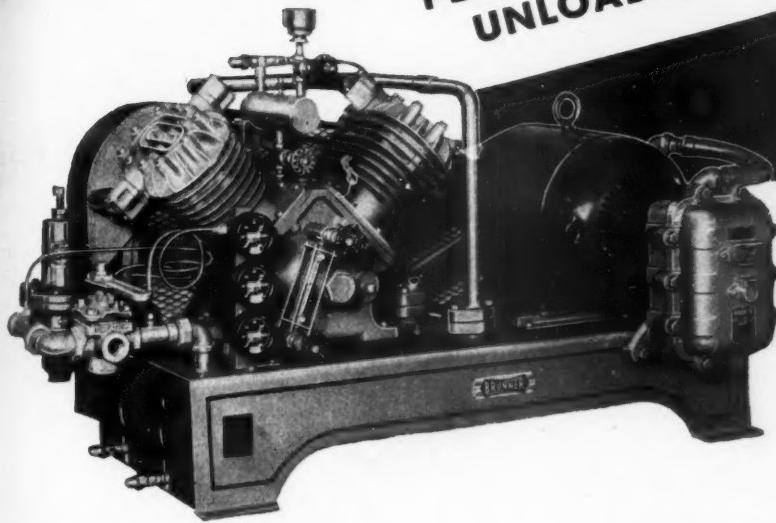
Arthur W. Jones, sales promotion manager of Standard Gas Equipment Corp., New York City, has been appointed chief statistician of the shoe and leather products section of O.P.M., Washington, D. C. For several years he was associated with the National Boot and Shoe Manufacturers Association and there acquired a detailed knowledge of the boot and shoe industry which is now being called into use.

A leave of absence has been given to Mr. Jones, and he expects to return to Standard Gas when his work in Washington is completed. In the meantime, his assistant, Robert E. Laffin, will carry on.

W. Frank Roberts, president of Standard Gas Equipment Corp., is O.P.M. Coordinator for Maryland and is also in charge of priorities in the Baltimore area.

SAVE

500 TO 1000 LBS. LP-GAS
PER TANK CAR
UNLOADED



How the New Brunner LP-Gas Unit reduces losses in tank car unloading

You'll slash your tank car unloading and bottle filling costs of LPG with Brunner self-contained LP-Gas compressor units because they're built for efficient, safe handling of liquified petroleum gas. Tested and proved

in actual plant operation, Brunner units actually recover an additional 500 to 1000 lbs. of LPG from every tank car unloaded. Brunner compressor units cut unloading time, too...only 4 to 6 hours required for a 10,000 gallon car. These outstanding accomplishments alone rapidly pay for the original investment. Brunner Manufacturing Co., Utica, N. Y., U. S. A.

BRUNNER

FOR OVER 30 YEARS
THE SYMBOL OF QUALITY

WRITE FOR FREE BOOKLET

- This booklet describes the new Brunner LP-Gas Unit. Contains illustrations, diagrams and other pertinent facts on handling liquified petroleum gas.



BUTANE *Power*

Butane Replaces 30 Horses On Northwest Grain Combine

DURING the past year liquefied petroleum gas has found many new jobs to do in the expanding industries of the great Northwest. Such ones as agriculture, lumbering and fishing are opening new markets for LP-Gas dealers throughout that vast area through

demanding the services of butane and propane for engine power, industrial and domestic uses.

With the added demands for the all-out efforts of national defense, the increasing importance of the fuel is in evidence everywhere. The part LP-Gas is playing is important, both from the point of fuel conservation and from the long range view of the industry's growth.

An example of butane's new part in the industries of the Northwest is an installation made during 1941 on a large grain combine used in the threshing of wheat on the rolling hills of eastern Washington.

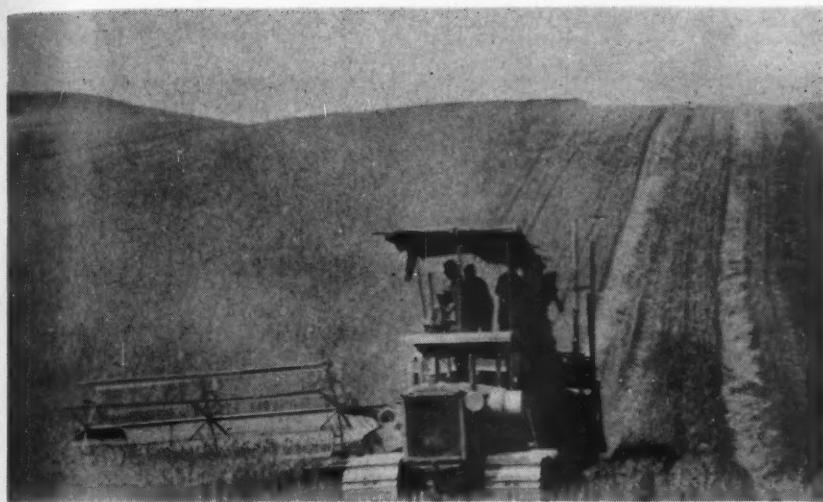
Economy and Speed Obtained

In the past, teams of horses or mules, numbering 30 or more, were used to pull the huge combine. It was a slow and expensive operation. When it was finally decided to use tractors as a source of power, the owners, anxious to have economy with speed and dependability, chose butane as their fuel.

Such a conversion was made by the Butane Engineering Co. of Walla Walla, Wash., for Guy Kent,



PAST methods of pulling wheat combines required large teams of 30 horses or mules. Harvesting was slow; team maintenance expensive.



PRESENT methods with a butane operated tractor offers faster operation, greater economy, less maintenance trouble.

a near-by grain farmer. Ensign carburetion equipment was placed on an Allis Chalmers K. O., 50-hp. engine which powered a large tractor. A butane storage tank was fastened to the left side of the tractor, immediately in front of the driver.

This butane equipped unit is now used by its owner to farm his 1700 acres of wheatland. The tractor is of course used also to supply power for many other operations on the ranch. However, as power for the combine it is especially important as grain growers seldom have more than one combine available and equipment must be in good operating condition throughout the harvesting season.

Butane has proven satisfactory in this respect, offering longer life to the engines, lower repair cost and more economical operation.

Butane Gas Service Co. Has Plant at Santa Cruz, Calif.

The Butane Gas Service Co., owned and operated by Vetterle Bros. & Houghton, now has a butane plant at 610 Soquel Ave., Santa Cruz, Calif. The company, with main offices at Soquel, Calif., has plants in other sections of the state.

The Monterey Bay Appliance Co., Soquel, acts as distributors for the company and carries a full line of LP-Gas appliances.

The Santa Cruz plant will specialize on butane conversions for trucks, tractors and other farm equipment.



L.P.G. Equipment Co. Opens Butane Station in California

The L.P.G. Equipment Co., of Oakland, has taken over a butane fueling station in Lafayette, Calif., and is now actively engaged in selling and distributing fuel to domestic and truck users. E. C. McEneany heads the firm.

R. C. von Glahn To Erect Station at Corcoran, Calif.

Plans for the installation of a modern service station which will sell butane for trucks have been announced by Elmer C. von Glahn, of Corcoran, Calif. The station, which will cost approximately \$25,000, will be located immediately south of the Corcoran airport, one mile west of town.

In addition to the fuel service, a sleeping room and hot and cold showers will be provided for truck drivers. A special steam plant for cleaning up tractors after the farm work season has closed is another feature of the new station.



California Tractor Shop Opens Branch Office

The Central Implement Co., with headquarters in Tulare, opened a new office and shop in Delano. A distributor of tractors and farm implements for a number of years this company has of late been making many butane conversions.

The modern shops have been pro-

vided with unique lighting features to aid in the installation of butane equipment. Ensign equipment is used exclusively on all conversions. Ted Conrad is manager of the new office.



Big Bear, Calif., Dealer Converts Delivery Truck

Completed during November in the shops of Parkhill-Wade, Los Angeles, a new butane operated delivery truck is being placed in service by Jack Betterley, owner-operator of Betterley's Hardware and Butane Gas Service at Big Bear Lake, Calif.

The truck will be used to service house bottle installations in the resort area around Big Bear. A 500-gal. butane tank was mounted on a 1939 Ford V-8, with a Smith pump and Brodie meter to handle the fuel.



Live Stock Hauling Increases

A second butane powered truck is now needed by Bechis-Smith, Oakdale, Calif., to haul live stock to market. Their first truck was purchased in August.



Ransome transport truck and trailer now in service hauling butane in bulk lots in northern California. It is powered by butane.

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ENSIGN

Speeds Up

PRODUCTION



Emergencies come and emergencies go. In the past thirty years of building carburetors, we have gladly turned on the midnight oil on many occasions. Night shifts have become necessary to meet the demands for more carburetors.

But increased man-hours alone isn't the complete answer. There's the procurement of materials and the allocation of finished products to many industries which calls for a closer cooperation between supplier and producer.

We are getting our shoulder to the wheel. Every facility of our Engineering and Production Departments and the wholehearted cooperation of every employee is utilized to the end that our customers engaged in national defense work are not kept waiting.

ENSIGN

CARBURETOR CO., LTD.

HUNTINGTON PARK, CALIF. • DALLAS, TEXAS • CHICAGO, ILL.



HOTSTREAM

**offers you a Defense
against Lost Sales
with the new L.P.G.**

PORCELAIN ENAMELED Automatic WATER HEATER

It's tough to get enough galvanized and non-ferrous tanks to take care of all your needs. So, to help you keep up your sales and build your load, we have developed the new Model "A" automatic heater for L. P. gas with porcelain enameled (glass-lined) tank, offering many advantages and greater profits.



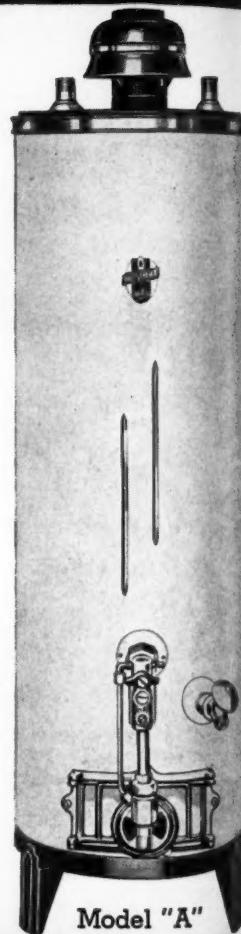
GUARANTEED 20 YEARS.
Armco Ingot Iron Tank,
heavily porcelain-enamedled
inside and out. New fusion-
weld process with built-in
spuds. No gaskets used.

ECONOMICAL, DEPENDABLE.
Heavily insulated—most effi-
cient type burners—trouble free
automatic operation—clean as
glass—no corrosion—no leaks—
no dirty, rusty water.



FIVE SIZES. 15, 20, 30, 40, 60
gallon capacities with inputs
from 10,000 to 40,000 B.i.u.

APPROVED by A. G. A., F. H.
A., U. S. H. A., P. B. A. and
the War Department.



Model "A"

THE HOTSTREAM HEATER COMPANY
8007 GRAND AVENUE CLEVELAND, OHIO

PRODUCTS

Room Thermostat

*Minneapolis-Honeywell Regulator Co.,
Minneapolis, Minn.*

*Model: Type T81 Acratherm Thermo-
stat.*

Description: A new low voltage room thermostat for use in controlling low voltage two-wire type valves and motors. It is similar in design and appearance to the Series 10 Acratherm except that S. P. S. T. snap action contacts are used to permit control of two-wire devices. Accurate control



is assured through the use of an artificial heater and an unusually sensitive bi-metal actuating element. The differential is adjustable and contacts are of ample capacity for low voltage loads. The Acratherm has a silver finish and is furnished with a detachable mounting plate to facilitate installation. It may be equipped with a locking cover to guard against tampering and a positive night cut-off to prevent any operation of the heating plant during the night at no extra cost. Standard range is 54° to 86° F.

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Domestic Range

*Cleveland Co-Operative Stove Co.,
2323 E. 67th St., Cleveland, Ohio.*

Model: "Grand Champion," RB-10.

Description: This model has six top burners, of which two are giant burners. Four have simmer valves.



The "Flexitop" is 40 in. wide with griddle. Oven is 19 in. deep; 18 in. wide; 13 1/4 in. high, with two safety-lock oven racks. Two large storage drawers have roller bearings and are self-latching. There is a "charcolator" high broiler; two-piece, extra deep, smokeless, broiler pan; "safe-tee-kee" master shut-off valve controlled by a removable key; removable chrome-plated burner caps; porcelain enameled front frame; flush-to-floor, flush-to-wall construction; and white, slant handles with chrome inlay. One of Grand's new "Lucky Seven" line.

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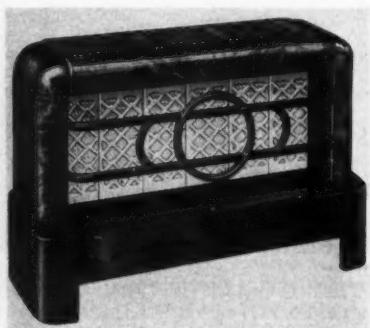
Radiant Circulator

*Tennessee Enamel Manufacturing Co.,
Nashville, Tenn.*

*Model: No. 428B Bu-Pro-Fire Radiant Circulator. Approved by A.G.A.
for LP-Gas.*

Description: This is one of a full line of heaters designed especially for the liquefied petroleum gas industry. The mechanical features have

been perfected to assure the utmost in performance, economy and durability. Cabinets are finished in "Lifetime" porcelain enamel to withstand heat, moisture and long usage under varying climatic conditions. The 100% safety pilot and domestic automatic room temperature control, assuring a safe, uniform temperature, are optional equipment. Equipped with a special, multiple injection, Bunsen type burner, developed in their own factory to meet the exact require-



ments of the LP-Gas industry. The flow of gas is controlled through fixed orifices, eliminating the possibility of improper adjustment while in service. Height—16½ in.; width—24½ in.; depth—13½ in.; B.t.u. input—28,000; weight (crated)—35 lbs.; approximate heating capacity—room 15 x 20 ft.; finish—black and walnut grained.

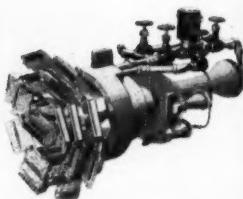
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Industrial Burner

F & E Manufacturing Co., Centerville, Calif.

Model: L J 20.

Description: This liquid burner is jacketed by a vaporizer with a venturi, pilot, preheater burners and the necessary high pressure valves and heavy fittings. The patented heads of the burner are so arranged that sufficient secondary air reaches them, thereby producing a hot fire. It is especially suitable



where a large input is required, and is used in direct firing into blowers and air ducts of dehydrators, rice dryers, citrus processors, apple dryers, walnut dryers, kilns, retorts and firing boilers. It may be used as a straight butane burner or as a combination using butane as a standby to the burner normally operating on natural or manufactured gas. Weight—175 lbs.; orifice size—No. 8; capacity—3,200,000 B.t.u.'s per hour; length—40 in.; width—16 in.

◆ ◆ ◆

Control Valve

General Controls Co., Glendale, Calif.
Model: Series K-20-5.

Description: A new valve designed for the control of refrigerants such as sulphur dioxide, freon and methyl chloride. Special features



are its low power consumption, quiet two-wire solenoid, free from A.C. hum, simplicity of design and packless construction. The bodies are forged; coils are moisture-resistant. A non-corrosive, hardened, wear-resistant needle insures positive control. Maximum operative fluid temperature is 240° F. The tube head is brazed and will not leak even with a burned-out coil. These valves are particularly recommended for small applications, and are highly efficient for fractional tonnage installations where continued tight shut-off is necessary. Also capable of handling larger capacities up to 2.5 tons freon. They also operate on air, water, gas and light oil. Made in one port size only—5/32 in., for standard 3/8 in. I. P. S. Series K-20-5 Valves are available with sweat or flare soldered connections in any desired combination. All main valves are held open electrically, eliminating compressor burden.

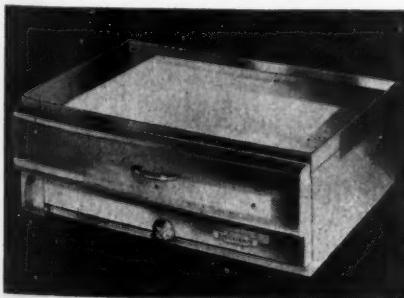


Gas Griddle

Majestic Manufacturing Co., St. Louis, Mo.

Model: "Kounter King."

Description: This is a newly improved gas griddle, suitable for use with LP-Gases, with improved thermostatic control. The use of a special designed single multi-tube burner, baffle plates over the flames, insulated sides, bottom and front, produce a uniform cooking tem-



perature over the entire griddle plate. The snap-acting thermostat comes on full at a slight drop in surface temperature and also effectively prevents any overheating.



Incinerator

Kohn Manufacturing Co., Milwaukee, Wis. Exclusive sales agent, Equipment Service Co., 154 E. Erie St., Chicago, Ill.

Model: "Original Incinerator."

Description: This is a popular-priced, domestic garbage incinerator and rubbish burner. Fired by gas, it has a capacity of 1½ bushels, and makes garbage and rubbish disposal an economic possibility for the average home. It embodies many new features for safety, economical operation, and convenience. Over-all diameter is 19 in. and height is 33½ in. Castings are of a special formulated high heat-resisting grey iron, which insures a long life and freedom from repair.

BETTER FLORENCE COOKING



Florence ovens are really BIG . . . with plenty of room for proper staggering of utensils . . . plenty of room for large roasts or a big batch of cakes or pies!

FLORENCE STOVE COMPANY

General Offices and Plant, Gardner, Mass.; Western Offices and Plant, Kankakee, Ill.; Sales Offices: 1459 Merchandise Mart, Chicago; 45 E. 17th Street, New York; 53 Alabama Street, S. W., Atlanta; 301 N. Market Street, Dallas; and 2730 16th Street, San Francisco.

FOR LIQUEFIED PETROLEUM GAS

BUILDS
BETTER
PAYLOADS!

You know that LPGas is one of the best cooking fuels in the world. You want your customers to feel that way about it.

That's No. 1 reason for showing Florence LPGas Ranges on your sales floor. Because your customers don't come to you for gas . . . they're looking for better cooking!

Florence features take "cooking at its best" into your customers' kitchens. They'll get more out of LPGas in easier, surer, pleasanter cooking.

Florence Ranges build good will for you . . . the sort of good will that brings you continuing, profitable payloads.

FLORENCE

Gas Ranges

BUTANE-PROPANE News

RESEARCH

• BUTANE-PROPANE News wishes to keep its readers informed regarding technical and practical advances concerning research, manufacture, development, and transportation in the liquefied petroleum gas field. In this column will be found a resume of recently published articles, papers, bulletins and books dealing with the industry's various phases.—Editor.

Chemical Conversion of Lighter Hydrocarbons—George Armistead, Jr. *Refiner*, Sept., 1941, pp. 327-336. The processes which are considered briefly in this article are as follows: 1. Catalytic polymerization; 2. Thermal polymerization; 3. Gas reversion (Poly-forming); 4. Thermal alkylation; 5. Catalytic alkylation; 6. Isomerization; 7. Dehydrogenation; 8. Fischer-Trepesch process; 9. Hydroforming and other aromatization; 10. Rubber substitutes from petroleum; 11. Miscellaneous chemicals.

P-V-T Relations for Saturated Liquids—H. P. Meissner and O. H. Paddison, Jr. *Industrial and Engineering Chemistry*, Sept., 1941, pp. 1189-1191. The engineer frequently faces the problem of predicting liquid densities. This can be done with reasonable accuracy by use of the charts presented in this article, if the critical temperature, critical pressure, and some vapor pressure data are available for the liquid in question.

Field Tests of Pipe Materials and Pipe Coatings in Soil—K. H. Logan. *Oil and Gas Journal*, Sept. 18, 1941, pp. 86, etc. Field corrosion tests have resulted in an understanding of the conditions under which pipe lines corrode. In adding to our knowledge of what may be expected from pipe materials, field tests have discredited several legends regarding the corrosion resistance of certain materials and have led to the development of

improved products for use underground. Because of the variability in the corrosiveness of soils within limited areas, the results of field tests are subject to wide variation. Nevertheless, it seems possible to detect differences of practical significance in the performance of materials. In the future, field tests may be expected to indicate the directions in which improvement in the corrosion resistance of metals and alloys should proceed, and to uncover the limitations of conclusions reached through tests.

Graphic Corrosion - Leak Record Guides Pipe-Line Protection—R. Wardwell, General Petroleum Corp. *Oil and Gas Journal*, Sept. 18, 1941, pp. 116, etc. It has been found that by clearly defining the troublesome segments of a pipeline system, the leak charts make it economically possible to carry out more intensive investigation and remedial work, since no effort is wasted on line that needs no attention. Some other form of recording leaks might serve equally as well as the system described, provided it called attention to the relationship of leaks to one another, and clearly indicated the time element. The system described was worked out by F. D. Posey, who was chief pipeline engineer for General Petroleum Corp. until his retirement in January.

Multicomponent Fractionation. Distribution of Three Components—J. J. Hogan. *Industrial and Engineering Chemistry*, Sept., 1941, pp. 1132-1138. For multicomponent rectification, a method is presented to determine the distribution of three components of the feed between the overhead and residue at total reflux and at minimum reflux. A new method for the

calculation of minimum reflux in multicomponent fractionation is developed. Examples are presented which illustrate the method of determining the minimum reflux and the results are compared with other recent methods. An example is also given showing the calculation of the distribution of three components of the feed.

Simplifying Orifice Meter Chart Calculations—H. L. Flood. *Petroleum Engineer*, Sept., 1941, pp. 29-32. Percentage approach is more readily grasped by chart readers; new mechanical calculator gives direct reading of fluid volume in one operation.

Test Procedures and General Information in Current Use in the Development and Utilization of Aviation, Motor, and Automotive Diesel Fuels. Compiled by the Cooperative Fuel Research Committee, May, 1941.

1941 Edition of the Refinery Catalog, Including Process Handbook and Engineering Data. Published by the Refiner and Natural Gasoline Manufacturer, Houston, Texas.

Combustible Gas Mixtures in Pipe Lines—E. Henderson. *G A S*, Sept., 1941, pp. 23-29. Their prevention by use of a slug of inert gas to separate natural gas and air in purging operations.

Method for Duplicating Road Octane on Multi-Cylinder Engines in "Lab."—J. A. Moller, H. L. Moir, F. C. Minor and R. R. Proctor. *National Petroleum News*, Sept. 3, 1941, pp. R283-285. A method for duplicating road octane rating in multicylinder engines in laboratories, developed by the Pure Oil Co., was described at the recent summer meeting of the Society of Automotive Engineers. The method uses the new "borderline" procedure for determining road octane values as correlated with engine speed, which new conception for expressing anti-knock characteristics of motor fuels was presented in the report on the 1940 road detonation tests

of the Co-operative Fuel Research Committee. A number of borderline knock curves were presented, showing how closely laboratory results duplicated actual road test data. It is believed, the authors state, that the fact that a borderline reference fuel framework, with a good spread, has been obtained, and fuels have been properly evaluated in relation to this pattern, would justify the assumption that unknown fuels could be rated and expected to fall in their proper place on the reference fuel pattern.

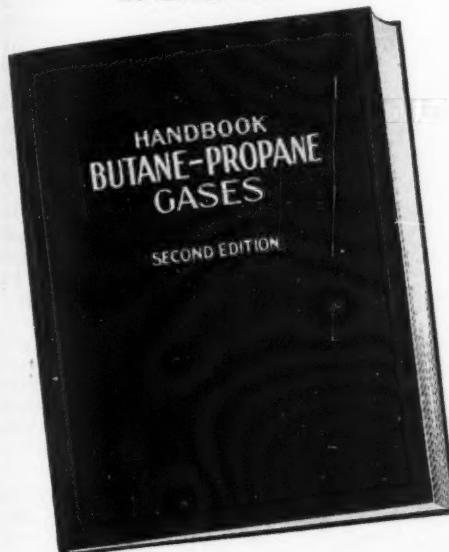
Considerations in Meter Setting—D. R. Putnam, general superintendent, Northern States Power Co., St. Paul, Minn. A general discussion of meter setting covering records, transportation, sets and unlocks, locking and removing, periodic changes, neck leaks and gaskets.—(Paper presented before the Mid-West Gas Association School and Conference, Iowa State College, Ames, Iowa, September, 1941.)

Heating Appliance Controls—H. C. Carlson, Jr., Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Outlines steps in the development of the thermostat for space heating appliance control. Next, briefly describes the details of operation of a few of the forced warm air control systems recently developed, among which are: two-speed fan control with single speed fan operation; two-stage firing with two-speed fan; two-stage thermostats operating through two limit controls on single stage fired intermittent gas installation.—(Paper presented before the Mid-West Gas Association School and Conference, Iowa State College, Ames, Iowa, September, 1941.)

Molal Volume Relationships Among Aliphatic Hydrocarbons at Their Boiling Points—G. Egloff and R. C. Kuder. *Journal of the Institute of Petroleum*, July, 1941, pp. 261, etc. The molal volumes of 63 aliphatic hydrocarbons (arranged in 14 different homologous series) at their boiling points have been correlated with the

Handbook BUTANE-PROPANE GASES

LATEST REVISION
NOVEMBER 1938



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Gases: Analysis & Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

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News

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number of carbon atoms in the molecule. The mean deviation of the calculated from observed values is 0.39 ml./mol. The boiling-point molal volumes of 43 aliphatic hydrocarbons in nine homologous series have been correlated with the boiling points, with a mean deviation of 0.62 ml./mol. The effect of the structure of the hydrocarbon molecule on the molal volume at the boiling point is discussed, and comparisons are made with the effect at 20°.

Refiner's Annual Process Section—
Refiner, Sept., 1941, pp. 337-385. Requirements for national defense and for the warring countries in Europe dominate the trend in refining process for 1941. Chiefly this is for the production of 100-octane aviation gasoline. It is these processes which are presented. Few of them are new, but distinct changes are recorded in both descriptive text and flow diagrams. In addition to aviation gasoline, the industry has ventured into chemical processing with toluol and synthetic rubber as the processes already in commercial stage. Because of the military situation it is neither wise nor possible to offer these processes. In addition there is also recorded changes in manufacture of ordinary gasolines and lubricants. The list of processes described follow: Badger two-stage crude distillation (asphalt); Badger two-stage vacuum lube distillation; Badger three-stage crude distillation; Badger three-stage naphtha redistillation; The Brugma process; Carrier distillation process; Catalytic alkylation process; Distillate recovery; Dubbs cracking process; the Edeleanu process; Foster - Wheeler two - stage crude distillation unit; Houdry catalytic cracking process; The Hydro-forming process; Knowles coking process; Lummus lubricating oil processing system; Lummus superfractionation process; Phenol extraction process; Polyo catalytic polymerization process; Shell butane isomerization process; Shell phosphate process; Sulfuric acid alkylation process; TVP process; UOP catalytic polymerization process; UOP isoctane process.

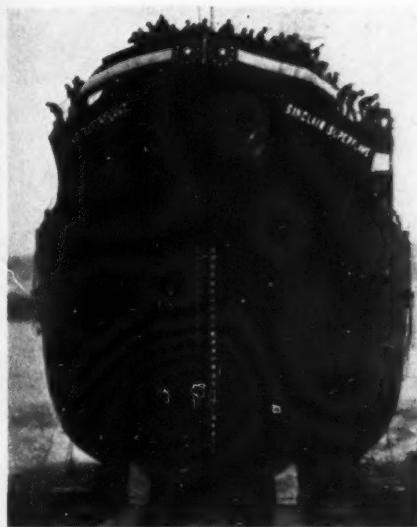
Gas Appliance Venting—John C. Mueller, Payne Furnace & Supply Co., Inc., Beverly Hills, Calif. Gas appliances venting has one prime function, to carry away and discharge the combustion products from the appliance to which attached. The performance of this function is made necessary by the presence of large quantities of water vapor and the possibility of carbon monoxide in the products of combustion. The energy available to produce vent action is relatively low and must be conserved by proper vent design. Six fundamentals of vent design are given, dealing with material, sizing, fittings and runs, draft hood, termination of vent, and durability.—(Paper presented before the Mid-West Gas Association School and Conference, Iowa State College, Ames, Iowa, September, 1941.)

Reprints are now available on the article titled "Combustion Experiments With Liquefied Petroleum Gases," by Frank Knoy, of the gas department, city of Long Beach, Calif., as printed in *GAS Magazine*, June, 1941, pp. 14-19. Information concerning the reprints may be obtained by addressing correspondence to: Frank Knoy, combustion engineer, Municipal Gas Dept., 307 Municipal Utilities Bldg., Long Beach, Calif.

The Oil Situation as it Affects the Gas Industry—*American Gas Journal*, Sept. 1941, pp. 11-13. The threatened shortage of oil in the states along the Atlantic seaboard from Maine to Florida has been causing grave concern to all users of petroleum products, including those operating carburetted water gas plants. Actual curtailment of gasoline deliveries has tended to emphasize the seriousness of the situation. The cause, what the petroleum industry is doing, the outlook for the gas industry, and recommendations of the American Gas Association are given.

Computing Gas Flow in Pipe Lines—P. M. Biddison. *Petroleum Engineer*, Sept., 1941, pp. 68-72. Part 2 Part 1 in August issue, p. 51.

Sinclair Ships Sail Seven Seas



Liberty Fleet Day Launching of
S.S. Sinclair Superflame

Sinclair has long since been a great service institution. Not only have our great refineries supplied the fuel and power needs of American homes, factories and motor cars, but our great fleet of tankers has sailed the seven seas to supply world markets.

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(Propane & Butane)
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and
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Industries,

For a dependable, co-operative source of supply call on

SINCLAIR PRAIRIE OIL COMPANY

Liquefied Petroleum Gas Division

Sinclair Building

Tulsa, Oklahoma

Emmert Appliances To Sell Skelgas in LaGrange, Ind.

Emmert Appliances, recently organized by Howard and Paul Emmert, is the title of a new appliance store in LaGrange, Ind., which will sell Skelgas stoves and cylinder gas.

The store, located in the Lenore Smith building, will be managed by Paul Emmert.



A. P. I. Sees Demonstration of Fire Control Methods

At the 22nd annual meeting of the American Petroleum Institute in San Francisco during the first week in November, liquefied petroleum gas was represented on the program by a paper and platform demonstration entitled, "The Characteristics of LP-Gas That Affect Its Fire Hazard," presented by Max B. Anfenger and Dr. O. W. Johnson, of the Standard

Oil Co. of Calif. This same demonstration has been given before many groups in California this year and has become an accepted standard of good safety and fire control practice. (See BUTANE-PROPANE News, March and April, 1941, pp. 11-16 and 50-58).

Most of the papers delivered before the convention dealt with defense problems as they affect the oil industry. The 1942 A.P.I. meeting will be held in Chicago, Nov. 9-13.



Burl Dukes To Sell LP-Gas Systems in Oklahoma City

Burl Dukes, butane dealer of Carnegie, Okla., recently left that city to become a butane gas and sales representative for a tank manufacturing firm in Oklahoma City.

Mr. Dukes will retain his butane interests in Carnegie which is included in the territory which he will serve.



This model liquefied petroleum gas kitchen was part of the extensive exhibit at the Minnesota State Fair of the Northwestern Blaugas Co., St. Paul. The display and continuous demonstrations resulted in many sales to interested visitors.



INVESTIGATE! SPRAGUE No. 0

a NEW, SMALL meter designed specifically for the measurement of L-P Gases. Rugged, made of cast iron, and simplified in construction. Delivers at $1\frac{1}{2}$ " W.C., 60 cu. ft. Propane, 55 cu. ft. Butane.

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Baking Oven	12 $\frac{3}{4}$ " x 16" x 19"
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Height to Cooking Top.....	36"
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VESTA LP-Gas Ranges

TIME TESTED
FOR GUARANTEED CUSTOMER
SATISFACTION

Every feature of flexibility, convenience and economy in the Vesta Range has been "time tested" in the final laboratory, the kitchens of American housewives. In practical operation, these fine ranges have demonstrated their flexibility in warming, boiling, frying, baking, broiling and roasting—their convenience in the arrangement of controls, burners and storage space—and their economy in fuel, food and time saving.

ATHENS STOVE WORKS, INC. **A THENS,
TENNESSEE**

Green's Fuel Dealers Hold Meeting in Panama City, Fla.

Approximately 150 distributors of Green's Fuel from Florida, North Carolina and South Carolina met October 27-28 at the Dixie-Sherman hotel in Panama City, Fla., to attend the annual convention of Green's Fuel Inc., whose headquarters are in Sarasota, Fla.

Principal speakers at the meeting, their company affiliations and subjects discussed are: Harold Norway, The Bastian-Blessing Co., "The ABC of Liquefied Petroleum Gas Safety"; John Mooney, Standard Equipment Co., "Planning a Commercial Sale";

Chase D. Maddox, Green's Fuel System Sales Co., "Construction and Maintenance of Green's Fuel Systems"; K. H. Koach, general manager, Green's Fuel, Inc., "Priorities"; G. J. Kollack, Peerless Manufacturing Co., "Profitable Heating Load"; H. A. Sebald, Ohio Foundry and Manufacturing Co., "House Warming"; D. T. Webster, Tappan Stove Co., "If She Could Only Cook", and Amos Mears, Servel, Inc., "Selling LPG Refrigerators vs. Electric Refrigerators."



Gas Advantages Featured In Peerless Counter Card

Advantages of gas were recently presented effectively in a counter card prepared by Peerless Manufacturing Corp., Louisville, Ky., for distribution to dealers of Peerless equipment throughout the country. Among the reasons enumerated for using gas were the following:

Gas heat is clean and safe.

Gas heat is always available.

The only fully automatic heat.

The easiest to control manually.

Healthful—maintains even temperature.

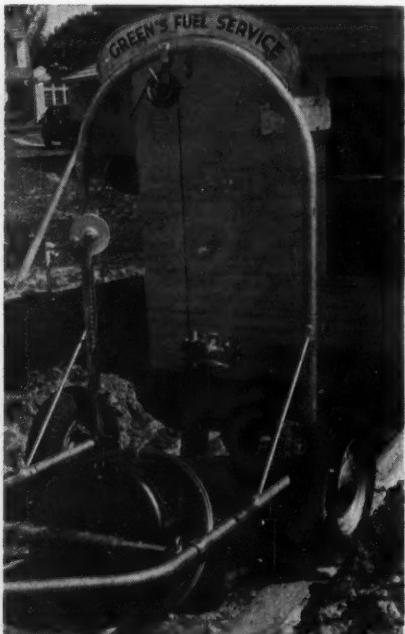
Economical and highly efficient.

Accompanying the emphasized selling points was a 10-line rhyme which tied in the company's line of products showing the advantages of gas heat. The rhyme, entitled "When Birds Fly South . . .", was illustrated by a color sketch showing three flying ducks.



Wilt Hardware Co. to Handle LP-Gas in Lamberton, Minn.

The Roman Wilt Hardware Co., Lamberton, Minn., has obtained the distributorship of bottled gas in that community. The company also handles gas stoves and automatic water heaters in connection with the agency.

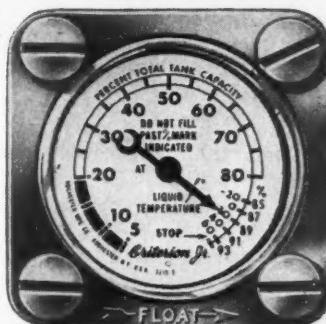


Green's Fuel, Inc., has applied for a patent on this trailer hoist, which provides a very effective method of installing large underground systems.

SAFETY FIRST . . . LAST and ALWAYS with ROCHESTER GAUGES on the Job!

Rochester Criterion Gauges incorporate the famous Rochester magnetic principle of operation which assures greater accuracy and positive leak-proof construction. Listed as Standard by Underwriters' Laboratories and distributed by manufacturers of L.P. Gas Systems. Adaptable to both above-ground and underground Systems also in I.C.C. and ASME Cylinders.

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ROCHESTER Criterion GAUGES

FOR MORE SATISFIED CUSTOMERS

For a More Dependable Source of Supply—A Stable and More Uniform Fuel—A Higher Quality Product—Look into the advantages of Carter Propane and Butane.

Write today for complete information. Address: The Carter Oil Company, Marketing Department, Room 928, National Bank of Tulsa Building, Tulsa, Oklahoma.

DEHYDRATED
Propane and Butane
THE CARTER OIL COMPANY

TULSA, OKLAHOMA
Shipping Points: Seminole, Okla., Stonewall, Okla., St. Elmo, Ill.
WHOLESALE ONLY!

Can You Pass This Test?

Part 2—What You Should Know About Fire Control

THE California Bureau of Trade and Industrial Relations holds training schools throughout the state frequently. These are under the direction of David F. Glines, supervisor of fire training, and include discussion of transportation and storage; safety devices and fire control methods as applied to liquified petroleum gases.

At the completion of the course, an examination is given to the attendants. Consisting of 100 questions, this examination is being presented to readers of BUTANE-PROPANE News in two successive issues. The first 50 questions appeared in the November issue (page 36) and the balance are given herewith. Answers will be found on Page 110.

Before turning to the answers, however, it is suggested that readers submit themselves to the test. If the statements appear true, encircle the "T"; if they appear false, encircle the "F". Grading should be on the basis of 1 per cent for each question.

51. T. F. Foam cannot cause a slop-over.

52. T. F. A slop-over is usually of greater magnitude than a boil-over.

53. T. F. A boil-over occurs only when the heat from the burning surface of the oil reaches the bottom of the oil.

54. T. F. Gasoline, kerosene and other refined oils are subject to boilovers.

55. T. F. Crude oil will usually slop-over readily but does not have a wide enough range of boiling points to boil-over.

56. T. F. The burning surface of heavy oil fires should be cooled with water before applying foam.

57. T. F. The burning surface of light oil fires must be cooled with water before applying foam.

58. T. F. Temperature indicator paint is always kept painted on large oil tanks.

59. T. F. It is possible to predict approximately when a boil-over will occur by the use of temperature indicator paint.

60. T. F. Burner oil when stored with considerable water in the tank, readily boils-over.

61. T. F. Temperature indicator paint will probably show a deep hot layer when fuel oil burns.

62. T. F. Shutting off fuel supply is the most effective method of extinguishing most fires.

63. T. F. The introduction of water into a tank ruptured near the bottom can shut off the fuel supply.

64. T. F. Vent fires can often be readily smothered by mechanical means.

65. T. F. Foam should never be applied gently and allowed to flow over the surface of the oil.

66. T. F. The froth on heavy oil produced by the application of water has no extinguishing value.

67. T. F. High flash, non-viscous oils will not froth on application of water.

68. T. F. Water broken into a fine spray, mist or fog has no value to absorb heat.

69. T. F. Under certain condi-



76 m.p.h. is "going some" on the water; and sales for Anchorgas are moving fast too. You'll have smooth, fast sailing when you call Anchor. Customers' requirements are given immediate attention. For fast, helpful service and a high quality Butane-Propane call or write Anchor.

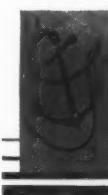
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"GAS HEATERS EXCLUSIVELY SINCE 1888"

tions, steam jets can produce static electricity.

70. T. F. The effectiveness of fire walls and dykes can be increased by the addition of a proper coping.

71. T. F. The vapor pressure of water becomes equal to atmosphere at 212° F.

72. T. F. The pressure of a cylinder of butane at room temperature is about 60 pounds per square inch.

73. T. F. At 212° F. the pressure of a cylinder of butane would increase to 350 pounds per square inch.

74. T. F. If not under pressure, butane will boil about 30° F.

75. T. F. The approximate explosive range for butane is 1.9 to 8.5 vapor mixed with 98.1 to 91.5 air.

76. T. F. The vapor from butane is only slightly heavier than air.

77. T. F. Butane vapor tends to flow upward, while natural gas tends to flow downwards.

78. T. F. Proper ventilation will disperse vapors of any kind.

79. T. F. Static sparks in butane tanks are likely to cause explosions.

80. T. F. Butane vapors are most likely to be trapped in the lowest portion of a room.

81. T. F. The commercial gas indicators are of great value in determining the presence of butane vapor.

82. T. F. As a liquid, butane must be stored under pressure and that is the important difference between it and such fuel as gasoline in regard to fire hazard.

83. T. F. Propane is quite similar to butane in regard to fire hazard.

84. T. F. Less pressure is required to keep propane a liquid than is required for butane.

85. T. F. Liquefied petroleum gases on the market are generally butane or propane or a mixture of the two.

86. T. F. Depending upon the percentage of mixtures of butane and propane, pressures in commercial cylinders may reach as high as 200 lbs. per sq. in. in summer heat.

87. T. F. From the standpoint of fire control, there is a great difference between butane and propane.

88. T. F. Fusible plugs on butane tanks are designed to let go when a temperature of 200° F. or more is reached.

89. T. F. Spring loaded relief valves are designed to let go at predetermined pressures.

90. T. F. Large butane tanks should be equipped with fusible plugs as well as relief valves.

91. T. F. It is sometimes possible to control a liquefied petroleum gas fire by shutting off the supply of fuel.

92. T. F. Butane is odorless but is usually odorized to make it smell like gas.

93. T. F. A liquid gallon of butane will produce about 3.5 cu. ft. of vapor.

94. T. F. When suddenly released, butane vapor may appear as a white cloud.

95. T. F. 100 liquid gallons of butane will cover an area of 65 ft. square, 1 ft. deep.

96. T. F. In butane fires it is the best policy to extinguish the fire before attempting to make shut-offs or otherwise control the flow.

97. T. F. The person responsible for the control of a petroleum or liquefied petroleum gas fire must consider the hazard to life and the exposure of adjacent property.

98. T. F. Successful control of oil fires depends upon close co-operation between public fire departments and oil company officials who are familiar with plant layout, equipment, and the fire characteristics of the oil.

99. T. F. Those in charge of fire protection should become familiar with all facilities (both public and private) which are available, including water supply, foam equipment, apparatus, equipment and manpower.

100. T. F. Good public and private fire prevention engineers consider the economic feasibility of proposed fire prevention measure when making recommendations.

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Despite the biggest volume of business in our 93-year history, including orders for national defense, we have been able, to date, to fill all orders for Blodgett Streamlined Baking and Roasting Ovens on schedule!

THE G. S. BLODGETT CO., Inc.
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For Added Power with **LESS FUEL!**

Thickstun

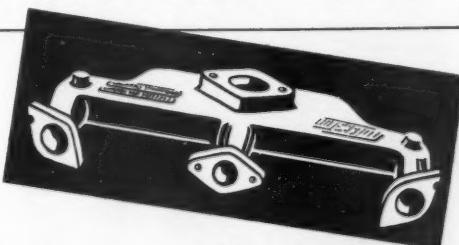
Butane Manifolds

At least 21% more power and 10% better mileage over the standard gasoline type manifold are offered you by the Thickstun Butane Manifold.

On an International DR-50, the use of a Thickstun increased fuel mileage from 5 mpg *without* trailer to 5.6 mpg *with* trailer. On Mack trucks with Thickstun manifolds, power was increased one-half gear and operation was smoother.

(As reported in *Butane-Propane News*,
August, 1941, pp. 74-75-76.)

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6. Greater Efficiency

ELECTRIC AND CARBURETOR ENGINEERING CO.

2223 E. 8th St.

"Pioneers of the Butane Industry."

Los Angeles, Calif.

Bulk Tanks Made For Ocean Shipment

BELOWED to be the first of their kind, liquefied petroleum gas bulk containers have been manufactured by the Southern Steel Co., San Antonio, Texas, for shipment aboard ocean-going vessels. They are said to comply fully with the requirements of all regulatory bodies for the transportation of butane on steamships.

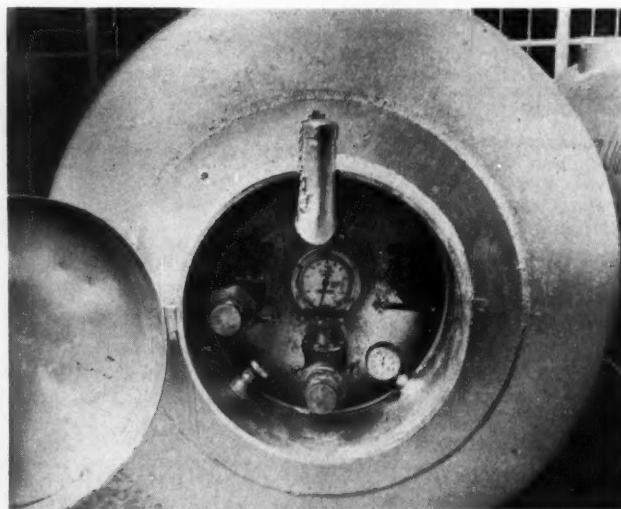
The containers hold approximately 900 gallons and are constructed under Paragraph U-68 of the A.S.M.E. Code for Unfired Pressure Vessels, which calls for stress relieving and X-raying of all welding.

This first lot of these special containers have been delivered to the Caribbean Hydro-Gas Company and

will be used for transporting butane from the Gulf Coast to certain Caribbean ports. The containers are carried on the deck, where they are securely attached to prevent rolling or shifting in transit. Each container is equipped with lifting lugs for lifting the container on and off deck. Special mounting is provided under each container, such that the container can be loaded on and off a motor truck chassis.

The Loading Process

The complete cycle of operation is as follows: First, the container is temporarily mounted on a motor truck chassis and is filled with butane at the refinery or bulk storage. Then, the full container is hauled to the shipping dock, where it is lifted off of the truck chassis and loaded onto the deck of the boat. At the destination the full container is lifted off the deck and loaded onto a motor truck and



The head of a "sea-going" LP-Gas tank, showing level and pressure gages, inlet and outlet valves, with safety devices.

That We Might Say "YES"

TOMORROW...

A Message to

Our Butane-Propane Customers:

Because of ever increasing defense orders and growing scarcity of some materials, our production schedule has been broken . . . to many we have had to say "no". But Viking Representatives in every section of the country stand ready to give advice on maintenance of Viking Pumps . . . to offer suggestions that will help you receive the utmost from the Viking Pumps you now have. Get in touch with the Viking Office nearest your plant or write direct to the Viking Factory.

We are still able to supply some B-P Pumps from stock. Write for list of models available.

VIKING PUMP CO.
• CEDAR FALLS, IOWA •

There are Viking Representatives or Sales and Service Offices in the Following Cities:

Chicago	Detroit
Cleveland	Houston
Indianapolis	Dallas
Kansas City	Kilgore
Los Angeles	Louisville
Milwaukee	Memphis
Minneapolis	Nashville
New York	New Orleans
Baltimore	Philadelphia
Boston	Pittsburgh
Buffalo	Richmond
Cincinnati	San Francisco
Denver	St. Louis
	Tulsa

**Yes, we're still filling
our customers' orders for
Butane Gas Equipment!**



Defense requirement restrictions are making it tough to get raw materials needed . . . but up to now we've done what we think is a swell job in meeting the requirements of our customers. Write or wire us about your needs—perhaps we can fill the bill exactly. We sell the nation's best Butane and Propane equipment for all needs.

SOUTHERN GAS & EQUIPMENT CO.

Little Rock,
Arkansas

ALL TYPES LPG EQUIPMENT

Birmingham,
Alabama

"Serving Arkansas, Louisiana, Missouri and the Southeast"



Warren L. Powell, chief engineer of Southern Steel Co., who is largely responsible for a new development in tank construction for ocean transportation; S. J. Eubank, Houston, Texas; C. C. Wright, owner of the Caribbean Hydro-Gas Co., Houston, and new 900-gal. LP-Gas tanks ready for ocean shipment from the Southern Steel plant.

carried to the bulk storage, where it is unloaded and returned by boat to the Gulf Coast for another load.

Approval Took Two Years

About two years was consumed in obtaining the necessary rules of the various regulatory bodies before permission was granted for the construction and use of such containers. The only approved method heretofore for transporting butane over seas was limited to ICC cylinders and these containers are thought to mark the first approved means of shipping butane over seas in other than the relatively small cylinders.

Stove Manufacturers Asked To Withhold Price Raises Now

In the interest of long range planning, manufacturers of domestic cooking and heating stoves have been asked not to raise prices above those prevailing on Oct. 24, 1941, by Leon Henderson, administrator, Office of Price Administration.

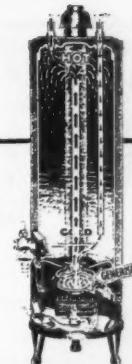
The action was taken in order to hold prices firm pending determination of the effect on costs of curtailment of output due to the defense program.

Long range price programs are being formulated by the Office of Price Administration and a meeting will be held with representatives of the industry in the near future to work out details.

Feature for Feature...

THE BEST WATER HEATERS IN EVERY PRICE CLASS!

Manufactured in every size and price range, General Water Heaters build load and good will everywhere they're sold. Every unit backed by liberal and truthful guarantees. Be SPECIFIC — Recommend GENERALS!



SPECIFICALLY
MADE FOR
BOTTLED
GASES

L.P.G. *General*
WATER HEATERS

General Water Heater Corp., 7 East Cypress Avenue, Burbank, Calif.
San Francisco • Detroit • Kansas City • Dallas • Houston • Memphis

DISTRIBUTED IN PRINCIPAL CITIES THROUGHOUT THE NATION

A COMPLETE VULCAN COOKING UNIT *For Auto-courts, Lunch Wagons, Luncheonettes, Etc.*



An ideal unit for the hundreds of eating places springing up around camps, factories, munition plants.

Has two big, all-purpose, insulated ovens with automatic heat controls, a fast broiler, an excellent griddle, a 4-burner short-order top and a "Kromloy" metal closed top. Only 64½" x 30½", yet complete kitchen in itself. Equipped with specially designed LPG burners.

Write for catalog BP-12

STANDARD
GAS EQUIPMENT CORP.

18 East 41st Street
New York

DEFEND HEALTH

WITH A

CONTINENTAL WATER HEATER

• • •

AMERICA NEEDS PHYSICAL FITNESS

Good health depends on
cleanliness and cleanliness
depends on hot water.

A.G.A.

Approved



Continental
WATER HEATER CO. LTD.
1637 N. Spring St., Los Angeles

SPARTAN
Automatic
Storage

BU-PRO-FIRE

HEATERS and FLOOR FURNACES
FOR LP GAS

Every Model in this Complete Line
is designed especially for LP
Gases. All Models are finished in
"Lifetime" Porcelain Enamel and
fully approved by A.G.A.

A wide range of sizes provides a
model for every
heating need.
Write us for lit-
erature, pictures
and prices.

TENNESSEE
ENAMEL MFG.
COMPANY

Nashville,
Tennessee



Warren Petroleum Will Make LP-Gases at New Plant

At an estimated cost of between \$350,000 and \$400,000, Warren Petroleum Co. started construction in early October of a large gasoline plant in Oklahoma that will make 21,500 gals. of liquefied petroleum gases daily. It is located in the Cumberland pool of Bryan and Marshall counties.

The plant will be equipped with nine 200-hp. compressors, operating at 5-in. vacuum intake and will discharge 300-lb. pressure. Fractionation equipment will include a deethanizer, a deproponizer, a debutanizer and a deisobutanizer. Products will be 6000 gal. daily of propane, 3500 gal. of isobutane, 12,000 gal. of normal butane and 18,000 gal. of natural gasoline from approximately 8,000,000 cu. ft. of gas daily. An oil circulation of 150 gal. per minute at 300-lb. pressure will be maintained on the high-pressure absorber.

A tank-car loading rack for both the natural gasoline and the liquefied petroleum gases will be constructed at Aylesworth.

♦ ♦ ♦

Eliminating Range Lids Will Save Steel for Defense

Manufacturers have been asked to eliminate steel cover lids from domestic cooking ranges by Dec. 15, 1941, the Office of Price Administration and the Division of Civilian Supply, Office of Production Management, announced Nov. 9.

These tops, usually finished in baked enamel, are used on many gas, electric, kerosene, and gasoline stoves to cover the cooking surface when the stove is not in use.

By discontinuing these covers, manufacturers will reduce production costs and at the same time make available for more essential uses about 2500 tons of steel a year.

CROWN

GAS RANGES for



YOU'RE AHEAD IN THE
LONG RUN SELLING CROWN RANGES
Crown have set the pace for Style—Beauty—Convenience and Utility for years. Crown are the originators of Buffet Ranges—best evidence of Leadership. Write for Dealer Proposition.

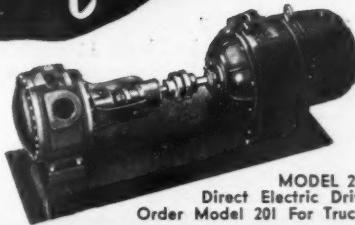
CROWN STOVE WORKS

4631 W. 12th PLACE, CHICAGO

Originators of BUFFET and DIVIDED-TOP GAS RANGES

L
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A
S

Satisfied
Customers



MODEL 200
Direct Electric Drive
Order Model 201 For Trucks

Superior FLARE FITTINGS

Especially for

L.P.G. INSTALLATIONS



SAE (Flare) Unions,
Couplings, Adapters,
Elbows, Tees,
Crosses and Nuts

Listed as Standard by
UNDERWRITERS
LABORATORIES,
INC.



WRITE FOR BULLETIN

SUPERIOR VALVE & FITTINGS CO.
1509 WEST LIBERTY AVENUE
PITTSBURGH • PENNSYLVANIA

Hundreds of installations
with no repairs through
out the year
Balance eliminates
internal wear
Fluid sealed packing
box - cannot leak
Ample delivery
against high pressure

Models for Every Purpose

Write for Data

A new Model 210 for Bottling

Immediate Deliveries

SMITH PRECISION PRODUCTS CO.
1135 Mission St. South Pasadena, Calif.

SMITH
BUTANE - PROPANE
PUMPS

Roper Corp. Is Building New Defense Plant

In order to cooperate fully with the National Government the Geo. D. Roper Corp., Rockford, Ill., is now building a new \$500,000 plant for the manufacture of 75 millimeter armor piercing shot for the United States army. (A 75 millimeter shot is approximately 3 in. in diameter, 9 in. long and weighs about 14 lbs.) About 300 people will be employed in this new defense plant.

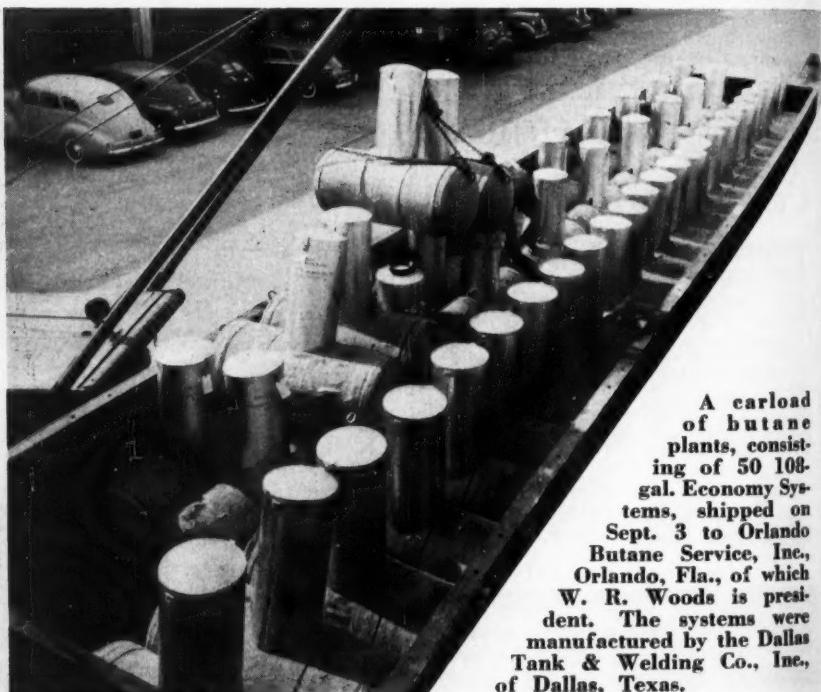
The Roper Corp. has three objectives in this project, namely, to contribute to the defense effort; to serve Roper customers in the best manner consistent with the present emergency, and to maintain jobs for Roper

employees and to retain skilled workmen so their services will be available when peaceful times return.

New LP-Gas Firm Will Serve Residents of Greentop, Mo.

The Greentop Economy Gas Co. was opened for business recently in Greentop, Mo., by H. E. Mikel and Nathan Welborn, who founded the firm following the sale of between 60 and 70 new bottled gas stoves in the community. Mr. Mikel and Mr. Welborn decided to build the bulk plant in order to reduce the number of trips to Cedar Rapids, Iowa, previously necessary in order to refill the bottles.

The bulk plant includes two bulk tanks, each of 1100-gal. capacity.



A carload of butane plants, consisting of 50 108-gal. Economy Systems, shipped on Sept. 3 to Orlando Butane Service, Inc., Orlando, Fla., of which W. R. Woods is president. The systems were manufactured by the Dallas Tank & Welding Co., Inc., of Dallas, Texas.

*For Safety
and Economy*

ETHYL MERCAPTAN

—Purified—

The ACCEPTED
standard
odorant
for liquefied
petroleum
gases.

MALLINCKRODT
CHEMICAL WORKS

ST. LOUIS

NEW YORK

F & E

Fast and Efficient

Non-Vented Greenhouse Heaters

4 Proven Selling Points

1. Economical as to Operation
2. Inexpensive as to Installation
3. Safe, Butane Promotes Growth of Plants
4. Blessings of Automatic Controls

For full details of our complete line
of L.P.G. Burners and Torches

Write to

F. & E. Mfg. Co.
P. O. Box D Centerville, Calif.



Plant of the Vulcan Proofing Company,
Brooklyn, N. Y.

For LPG Meters and Regulators

Vulcan Synthetic Diaphragms do not shrink or change dimensions in any direction.

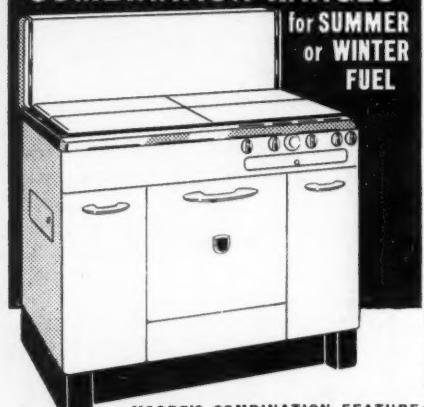
Extremely flexible . . . making for sensitive operation, accurate measurement.

Diaphragms for all LPG purposes. Write for details.

Vulcan Proofing Company
First Avenue and Fifty-eighth Street
Brooklyn, New York

VULCAN
NON-LEATHER
LPG
METER and REGULATOR
DIAPHRAGMS

MOORE'S COMBINATION RANGES



for SUMMER
or WINTER
FUEL

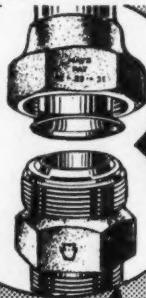
MOORE'S COMBINATION FEATURE:

- Coal or oil and LP-Gas
- 2 or 4 coal or oil covers
- Full oven size on all fuels
- 4 gas top burners
- No dampers to operate
- No baffles to handle

THE MOORE CORPORATION

Quality Since 1857 JOLIET, ILLINOIS

45°
Plus
90°
Seats



For
Leak Proof
L-P Gas
Piping

Double Seals

PULL TEST

A $3\frac{1}{2}$ " DOUBLE SEAL held its grip on copper pipe on increasing pull to 2260 lbs. without leakage. 1000 lbs. is standard requirement. DOUBLE SEALS are safe for L-P Gas piping and are approved by Underwriters' Laboratories.

HAYS MFG. CO., Erie, Pa.

Shell Appoints W. H. Eaton, Jr., General Sales Manager

According to an announcement made today by L. T. Kittinger, vice president in charge of marketing of Shell Oil Co., Inc., W. H. Eaton, Jr., has been appointed general sales manager, succeeding Ralph H. Erichsen, who has resigned.



W. H. EATON, JR.

Mr. Eaton began working for Shell as an attorney in the company's Pacific Coast territory and in 1936 was transferred to St. Louis as assistant to the president. He was advanced to manager of the company's transportation and supplies department in 1938. After the consolidation of the Mid-West and eastern companies, he was appointed division manager of the Atlanta territory, which comprises six southern states. In his present capacity he will be in charge of the company's sales east of the Rocky Mountains.

◆ ◆ ◆

T. P. Curran Urges LP-Gas Installation in Salida, Colo.

Thomas P. Curran, of Denver, has placed before the city council of Salida, Colo., an application for a permit to install an LP-Gas supply system in that city. A bulk plant has been built west of Salida and Mr. Curran said that 14 miles of pipe would be needed to supply the city with the gas. Cost would be approximately \$40,000.

Mr. Curran recommended that bonds be issued to raise money, which could be paid off out of the net revenue of the plant. The council took the matter under consideration.

Only **UTILITY** Has it!

The **UTILITY ALL-WEATHER** Butane System contains new and outstanding features not available on any other system. Guaranteed to operate satisfactorily in extremely cold climates without artificial heat exchange. It **WILL NOT FREEZE**. Reduces service calls . . . Saves up to 25% on initial cost . . . Increases profits for you!

BUTANE EQUIPMENT CO., INC.

DALLAS, TEXAS

Phone Harwood 2146

3301 S. Lamar

**PROVED FOR
LIQUIFIED PETROLEUM GASES
BEFORE YOU BUY, COMPARE THESE
10 OUTSTANDING VALUES**



Type K-3B

WRITE FOR 1941 CATALOG

GENERAL CONTROLS
450 E. Ohio St.  Chicago, Ill.

267 5th Avenue
New York City

Distributors and Stocks in All Principal Cities



WARREN'S BUTANE
AND PROPANE ARE
UNEXCELLED
FOR THESE AND OTHER
INDUSTRIAL USES

- Internal Combustion Engines
- Annealing
- Metal Cutting
- Vitreous Enameling
- Plate Heating
- Baking
- Galvanizing
- Drying

Partners—Not Competitors
Of Our Customers

**WARREN
PETROLEUM CORP.**
Manufacturers and Wholesalers
Tulsa, Okla.

Moore Robinson, of A.G.A., Passed Away Oct. 19

Friends of Moore Robinson of the American Gas Association Testing Laboratories will regret to learn of his death on Oct. 19, following a short illness. He had been employed continuously in the maintenance department since May, 1926.

Mr. Robinson was born in Belfast, Ireland, in 1897 and came to the United States 18 years ago.



N.G.A. and A.P.I. Delegates Attend C.N.G.A. Fall Meeting

The 16th annual Fall meeting of the California Natural Gasoline Association, held in Los Angeles on Oct. 31, had an unusually large out-of-state attendance, due to the fact that it just preceded the annual A.P.I. convention in San Francisco and many delegates to that gathering left home in time to register at the C.N.G.A. meeting. Among them were many members of the Natural Gasoline Association of America.

Of special interest to LP-Gas men was a paper entitled, "Studies in Standardization of Gaging Methods for the Shipping of Liquid Petroleum Products by Vehicular Units," by W. B. Parks, of the Norwalk Co. A photograph of the speakers is shown on this page.

Presiding over the meeting was W. C. Dayhuff, who is president of the C.N.G.A., but not president of the Standard Oil Co. of California, as was mistakenly published last month.

A banquet closed the meeting.



Bulletin Available on Clark Steam Driven "Angle"

Clark Bros. Co., Olean, N. Y., have announced that a bulletin is now ready for distribution on the new Clark "Angle" steam engine driven compressor. The company will be glad to send this bulletin, No. 200-73, to engineers and others desiring it. Requests should be sent to the company's home office.



Speakers at annual fall meeting of California Natural Gasoline Association, Los Angeles, Oct. 31. Left to right: Dr. Harold Washburn, P. C. Dixon, Dr. B. H. Sage, Paul M. Raigorodsky, Herbert Hoover, Jr., T. A. Dunlap, W. B. Parks, Dr. E. R. Smoley, Dr. W. N. Lacey, Geo. P. Bunn, and J. E. Laurance.

NATIONAL
Thermo-Syphon
SYSTEM

and

National Automatic Gas
SYSTEM

Patented Systems

Protected Territories

Write or Phone

National Butane Gas Co.
MEMPHIS, TENNESSEE

===== YOU'LL BE BUSY =====



No. 6190 A

As a draftee on the Saturday after payday if you stock up on this improved Peerless Radiant Circulator now. Unvented, with 5 double radiants, its output is 20,000 B.T.U.'s. Attractively finished in two-toned brown porcelain enamel. Approved by A.G.A. for use with liquefied petroleum gas. Order today.

PEERLESS
Manufacturing Corporation
INCORPORATED
LOUISVILLE • KENTUCKY

THE LAST WORD
in Modern Metering



NEW BU-40
SMITH LIQUID BUTANE METER

For Tank Trucks and Dispensing Racks

- Put an end to costly metering errors with new BU-40 Smith Meters . . . precision-built on the exclusive Smith rotary principle and combined with advanced engineering to assure accurate metering of liquefied petroleum gases.

The Smith BU-40 Liquid Butane Meter has a capacity of 50 G.P.M. Operates with 250 lbs. working pressure. Equipped with built-in strainers. No reciprocating or oscillating pistons or valves to wear and impair accuracy or retard flow. Available in Master model for corrosive gases or Standard model for non-corrosive gases. Choice of (1) horizontal re-set counter, (2) 10" vertical dial, (3) large numeral register, (4) large numeral register and ticket printer. Either or any of the above with or without set stop mechanism.

For complete details write for Bulletin No. 123.

SMITH METER COMPANY

SUBSIDIARY OF A. O. SMITH CORPORATION
Factories at Los Angeles and Milwaukee

Sales Offices
NEW YORK, CHICAGO, HOUSTON,
LOS ANGELES
LOCAL STOCKS AT CONVENIENT POINTS
LOCAL AGENTS IN ALL PRINCIPAL CITIES

City of Santa Maria, Calif. Passes Ordinance on Gases

The city council of Santa Maria, Calif., passed an ordinance recently providing regulations for the storage of flammable liquids and gases.

All storage tanks and containers of liquefied petroleum gases, either above or below the ground will be limited to a water capacity of 2,000 gals.



Payne's Part in Defense Told in Company Book

Payne Furnace & Supply Co., Inc., Beverly Hills, Calif., chose an impressive manner of carrying a two-fold message to its dealers and distributors when it devoted the entire cover of "The Payne Pilot" (house organ of the company) for Aug.-Sept. 1941, to the explanation of

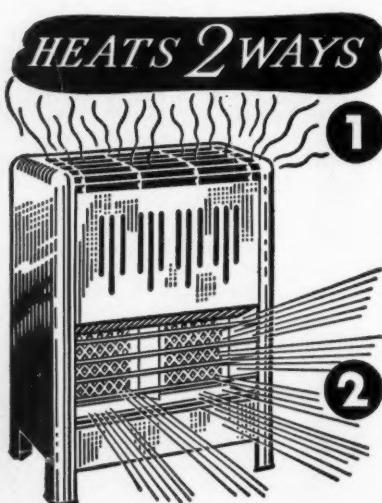
"Payne's Part in Defense," as the page was headlined.

Not only did the company list 31 army camps in Louisiana, Texas, Mississippi, California, Kansas, Oklahoma, Indiana and Utah which have been supplied heating equipment by the company in the last few months, with locations and pictures of some of the camps, but it also passed on credit to the dealers and distributors who have put the company in a position so that it is able to do its part in the defense program.



Arcola, Ill., Now Has Skelgas

The Skelgas dealership in Arcola, Ill. was given to Mac's Radio Shop of that city in early September. The distributorship offers Skelgas service and carries a stock of LP-Gas ranges, refrigerators and water heaters.



GIVES YOU... TWO-WAY ...PROFITS

Humphrey "Open Front" RADIANTFIRE CIRCULATOR

These heaters do a double job for you and your customers. There's a retail profit on their sale, and another bigger profit on the extra load they build.

To your customers, they give the double advantage of radiant heat and warm air circulated heat. Humphrey Radiantfire Circulators have full "open front" design for full radiant heat output. Ingenious heat-exchangers add the benefits of circulated warm air. Three sizes are available. Send for Bulletin RC-40-2 for complete sales information.

GENERAL GAS LIGHT CO., Kalamazoo, Mich.

Our CREED

- To render good service — to give a full dollar's worth for every dollar paid us.
- To produce the finest products of their kind that can be made.
- To employ only such representatives as are truly in accord with our high ideals and methods; and only such workmen as are able to produce American quality.
- To so transact our business as to merit and receive the fullest confidence of those with whom we deal.

American Pipe & Steel Corp.

Manufacturers and Distributors

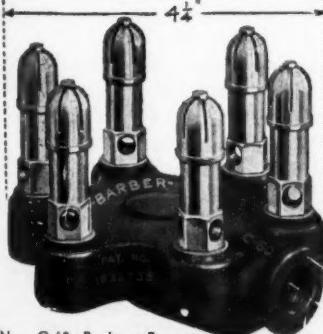
Alhambra

California

WE'RE TELLING YOUR CUSTOMERS



SIX leading magazines carry this story as part of our 38 million Magic Chef advertising messages this fall. For 14 years we've been doing a selling job for beyond-the-gas-mains gas cooking.



BARBER APPLIANCE BURNERS

The burner is the heart of the appliance. Barber Burner Units are correctly designed, with the proper jets, to fit the individual appliance, and give complete combustion on Butane-Propane Gas. Appliance makers and fuel distributors assure better service and economy for their customers by recommending the use of Barber Burners. Submit your burner problems to us. Catalog of complete line on request.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio



Magic Chef Ranges are built especially for use with LP-Gas and our Research Laboratory has devoted years of attention to this development. The Magic Chef franchise is still open in some areas. Write now for details.

AMERICAN STOVE CO.
4301 Perkins Ave. Cleveland, Ohio

ANSWERS

To Chapter 6 The Bottled Gas Manual

Here are the answers to the questions on Page 54 and which refer to problems in Chapter 6 of THE BOTTLED GAS MANUAL:

1. A. Simple discharge manifold systems.
B. Check manifold systems.
C. Manual two-way manifold systems.
2. The customer may forget to close all appliance valves when changing from one side of the system to the other, thereby allowing unburned gas to escape into the building when the reserve side is turned on.
3. An automatic cut-off valve.

4. A. By mechanical devices such as cams, wedges, or inclined planes to compress the spring.
B. By bringing a weight to bear upon one end of the spring.
5. A. Light appliance burners.
B. Turn off the cylinder valves on the reserve side of system. If burners go out immediately or after two or three minutes of operation the service side of the system is exhausted.
6. A. Close cylinder valves on the exhausted bottles.
B. Move shifting mechanism so that the side of the system on which bottles are being replaced becomes the reserve side.
C. Disconnect empty cylinders and replace with filled ones.
D. See that *all* cylinder valves are open.
7. The system would shift onto the reserve side until the service side recovered.
8. The system would only be able to supply the amount of gas which the reserve cylinders could vaporize.
9. By pouring warm water (not hotter than 125° Fahrenheit) on the outside of the cylinders.
10. In case that it is necessary to make repairs on, or replace the regulator, temporary service can be provided without shutting down the system by means of a 20-lb. cylinder and regulator. This is connected into the system at some point beyond the shut-off valve. A common practice for just a few minutes is to remove a range burner spud and connect from the regulator to the burner valve by means of a rubber hose securely wired into place. CAUTION: An employe should be in attendance at all times and in the immediate vicinity of a temporary connection of this nature while it is in use.

McNAMAR *Tanks*

- TRUCK TANKS
- TRANSPORTS
- SKID TANKS
- STORAGE TANKS
- UNDERGROUND SYSTEMS

All tanks ASME U-69, inspected by
Ocean Accident & Guarantee Corp., Ltd.

McNAMAR BOILER AND TANK COMPANY

Tulsa, Oklahoma

Salem, Illinois

Louisiana Dealer Group Joins National L.P.G.A.

Announcement has been made by Frank Fetherston, secretary of the Liquefied Petroleum Gas Association that, effective Oct. 1, the Louisiana Butane Dealers' Association, with headquarters in Baton Rouge, La., of which L. Abramson, Jr., Petrolane Gas Co., of New Orleans, is president, has become directly affiliated with the Liquefied Petroleum Gas Association. The affiliation is made on a basis whereby the benefits of the national association can be extended to the members of the state association.

In forming the affiliation with the national association the Louisiana Butane Dealers' Association realizes that there is a job to be done for the good of the industry nationally and that by becoming directly affiliated with the national organization the state group will be contributing its part to the growth of the industry.



American Meter Appoints New Men in Mid-West and East

The board of directors of American Meter Co., has advanced C. B. Dushane, Jr. to the management of the Mid-West territory, according to a recent announcement.

This promotion came in recognition of Mr. Dushane's 21 years in company service, during which time he successively occupied the positions of representative, engineer, and assistant manager.

Mr. Dushane received his technical training at the Baltimore Institute of Technology, Johns Hopkins University and Massachusetts Institute of Technology.

As an active participant in Gas Association work, Mr. Dushane holds membership in the American Gas Association, the Illinois, Indiana,

Michigan and Wisconsin State Associations. He also is past president of the Mid-West Gas Association and permanent member of its executive council.

American Meter Co. has also announced the recent promotion of William G. Hamilton, Jr., to the position of assistant manager of the Philadelphia factory and sales territory, in recognition of his contributions to the production and sales engineering of company products.

After formal education at Penn Charter Academy and Swarthmore College, Mr. Hamilton joined the organization Dec. 1, 1927. Since then he has applied himself extensively in the fields of pressure regulation, flow measurement and flow control, and will continue to specialize on this important phase of the company's engineering service.



Tappan Stove Co. Holding Window Display Contest

An opportunity to cash in on Christmas promotion has been offered to Tappan gas range dealers with the opening Nov. 10 of a \$1500 holiday window display contest.

Sixty-five awards, 13 to be given in each of five Tappan dealer classes, will be made.

Utility companies, department stores, appliance stores, furniture stores and hardware and sundry stores make up the five dealer classes eligible for the contest. Five first prizes of \$100 each will go to class winners.

Announcement of the contest, which will close Dec. 31, was made early last month by officials of the Tappan Stove Co., Mansfield, Ohio. Photographs of windows, accompanied by descriptive comments, will be judged at Mansfield on the basis of ownership appeal, originality, beauty, lighting, color, neatness and gift appeal.

GAS VALVES FITTINGS ACCESSORIES

*for Gas Burning
Appliances*

THE W. J. SCHOENBERGER CO.
CLEVELAND, OHIO



Wings of Progress!

Algas Multi-Jet Carburetors are recognized as the most advanced carburetion in the field. Exclusive features give more power, increased economy, and trouble-free performance.

Write for Literature

American Liquid Gas Corp.
LOS ANGELES CHICAGO

LP-Gas Serves Colorado Cities in Five-Day Crisis

When the lash of a Texas hurricane in September caused two major breaks in the Colorado Interstate Gas Co.'s pipe line and created a five-day crisis in numerous communities served by the line which runs from Amarillo, Texas, to Colorado, LP-Gas stepped in and saved a large number of industries from shutting down entirely and aided many commercial customers in Denver and Colorado Springs during the emergency.

The Skelgas Co., of Denver, alone, supplied approximately 75 industrial firms with LP-Gas. During the five-day period, the company ran 15,000 gals. of propane through the bulk plant. Bakeries, restaurants and numerous commercial establishments were dependent upon LP-Gas for several days. The *Denver Post* newspaper used 16,000 cu. ft. of LP-Gas in three days and followed up the catastrophe with an explanation of why and how it was enabled to operate as usual during the period.



Scaife Issues Free Booklet Covering Gas Cylinders

A colorful 16-page booklet has just been issued by Scaife Co., Oakmont, Pa., describing the company's complete line of LP-Gas cylinders, with information for LP-Gas distributors on construction features, tables, and data on the complete Scaife LP-Gas cylinder line, together with examples of representative cylinder systems.

The handbook shows by photographs and diagrams the fabrication process by which cylinders are made.

Information and data contained in this handbook is of interest to every LP-Gas distributor. Copies may be secured free by writing to Scaife Co., Oakmont, Pa., and asking for Bulletin 312.

L.P.G. Dealers Attention
BE
PREPARED
FOR

**SUB-ZERO
Temperatures**

Use our
Winter Grade
BUTANE-PROPANE
Mixtures.

Long term contracts solicited.

**Clute Petroleum
Company**

National Bank of Tulsa Bldg.
Tulsa, Okla.

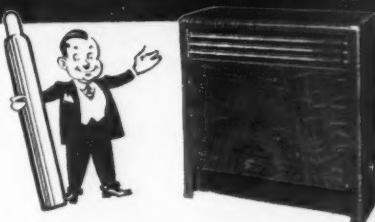
Pacific Coast Distributors for
Bastian-Blessing L.P.G. Equipment • Dayton Dowd Pump Co.
International Distributors for
Day & Night I.C.C. Cylinders
Manufacturers of
Vapor Differential Compre-
sors; Roney Valves & Fittings

LARGEST AND MOST EXPERIENCED
MANUFACTURING ENGINEERS AND
JOBBERS OF L. P. G. EQUIPMENT

Whatever the Need
Whatever the Problem
"WRITE RONEY"

L.C. RONEY INC.
1710-44 W 59th ST - LOS ANGELES, CALIF.

**HEALTH "PRIORITIES"
FOR L.P.G. USERS**



**AUTOMATIC HEATING
CUTS FUEL COSTS**

L. P. G. dealers praise the dependability, economy and automatic performance of PACIFIC Gas Heating Appliances. They know that *Pacific's* complete L.P.G. line is engineered to fit today's L.P.G. needs exactly. Now, with National attention focused on conservation and health, L.P.G. dealers can capitalize on the time-tested operation economy and automatic, healthful temperature control of *Pacific* heaters.

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Pacific
GAS RADIATOR CO.
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New LP-Gas Association Organized in Southwest

The liquefied gas industry of the Texas Panhandle, New Mexico, Oklahoma, Kansas and Colorado organized the Liquefied Gas Association in Amarillo, Texas, at a meeting held during the last week of October.

The purpose of the association is to promote safety and to make a bid for priorities in steel. R. E. Clements, of Amarillo, newly-elected president of the association, said it is essential that steel be made available for the manufacture of liquefied gas containers, valves and other equipment for the industry. LP-Gas, used on a large scale in rural sections for fuel and power and for pumping water wells in the irrigation belt of the plains, constitutes an essential.

Mr. Clements stated that the association would appeal for enough steel to keep the industry going. In sections of the five states represented in the association are centered much of the nation's supply of gas and many manufacturers of containers.

Directors of the association are: T. A. Sacra, Roswell, N. M., who is also vice president; Howard Nash, Guymon, Okla.; William Hettie, Liberal, Kan.; L. D. Turner, Denver, Colo.; J. C. Flemming, Lubbock, Texas, also secretary-treasurer, and L. S. Hall, Amarillo.

Members of the executive committee are L. A. Purtell, Littlefield; L. K. Bray, Amarillo, and J. R. Boone of Shamrock, Texas.



STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933.

Of BUTANE-PROPANE News, published monthly at Los Angeles, California for October 1, 1941.

State of California, County of Los Angeles—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law, deposes and says

that he is the publisher of BUTANE-PROPANE News, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Jay Jenkins, 1709 W. 8th St., Los Angeles, Calif. Editor, Arthur Rohman, 1709 W. 8th St., Los Angeles, Calif. Managing Editor, Lynn C. Denny, 1709 W. 8th St., Los Angeles, Calif.

2. That the owner is (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Western Business Papers, Inc., 1709 W. 8th St., Los Angeles, Calif.; Jay E. Jenkins, Los Angeles, Calif.; James E. Jenkins, Los Angeles, Calif.; Craig Espy, Dallas, Texas; George H. Finley, Santa Barbara, Calif.; Arthur Rohman, Los Angeles, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is... (This information is required from daily publications only.)

JAY JENKINS, Signature of Publisher.

Sworn to and subscribed before me this 23rd day of September, 1941.

(Seal) SUSAN McCONNELL.
(My commission expires June 8th, 1943.)

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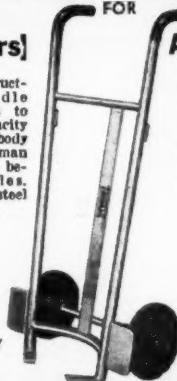
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With this information we shall be better able to schedule factory operations on a basis that more nearly matches monthly production to monthly needs.

May we have your cooperation to this end in order that both of us may level out peaks and valleys and so avoid disappointments that all too often result in lost customers . . . lost profits.

Please be assured every effort will be exerted to deliver your orders with the utmost promptness, but, in fairness to all, the sequence in which they are received must be observed.

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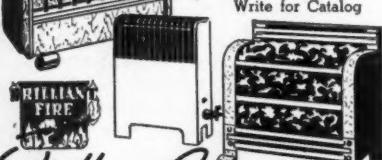
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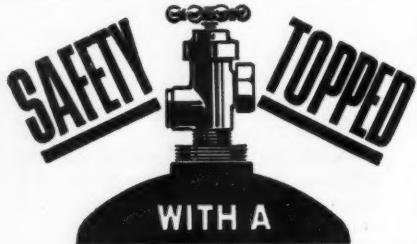
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Questions to test your knowledge of fire control practices of liquefied petroleum gases appear on Page 86. Here are the answers, as prepared by the California Bureau of Trade and Industrial Education:

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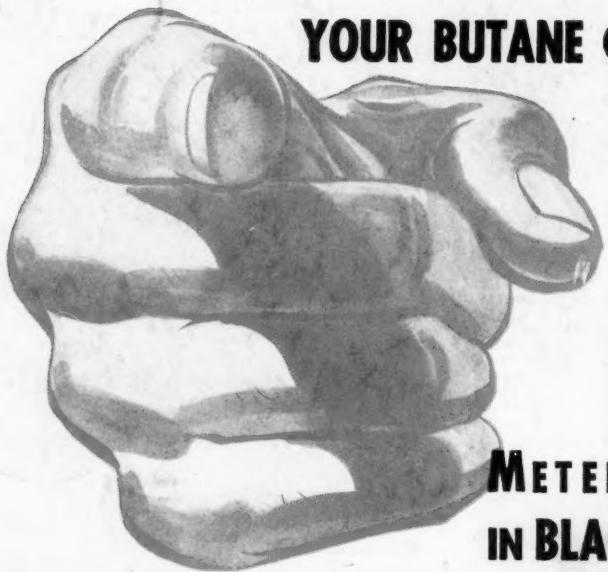
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